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NEW COMPUTER EXPRESS

FIRST NEWS • FIRST REVIEWS • BEST BUYS • YOUR WEEKLY GUIDE

THIS WEEK

AMIGA
A1500 price cut imminent
PLUS: The amazing A500 trade-in deal

ATARI
An ST compatible Unix workstation is announced
PLUS: A stereo ST for only £30 extra?

PC
WordStar for Windows 3!
PLUS: Where can you buy a 486 for less than £2,000?

CONSOLES
The joystick you can sit in!

FAXES:

Why buy a machine when you can just slot in a card?

BUDGET IBM 386 LOOMS

Big Blue's business solution is all set to take on the low-cost Macs – full details on page 7

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REGULAR TIPS & TRICKS FOR
MEGADRIVE
NINTENDO
ATARI LYNX
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& 44 PAGES OF
SHOPPING EXPRESS
BARGAINS !!!

SUPERCOMPUTERS

How you could soon have mainframe power at home

SPEEDBALL 2

Stylishly violent

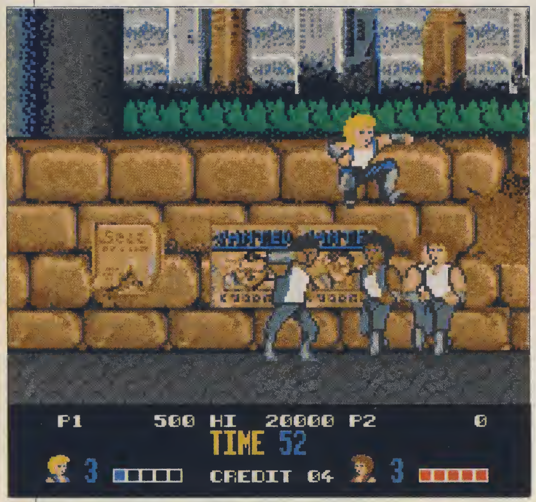
"WE MUST STOP THE SWEATSHOPS"

BRITAIN'S GAMES AUTHORS SPEAK OUT – SEE PAGE 8

frontend

edited by Colin Campbell

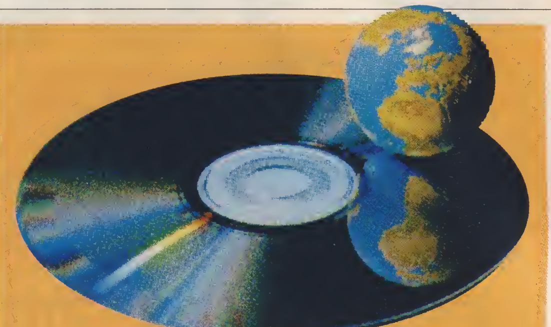
THE WAY OF THE DRAGON



Classic computer game *Double Dragon* is to be made into a movie. The world's favourite beat-'em-up should hit the big screen in the spring of 1992.

A script is being written and publisher Tradewest says it will follow the basic pattern of the game. Arcade fans and computer gamers will remember that *Double Dragon* involves twins Billy and Lee who beat the hell out of hundreds of bad sorts using all manner of martial arts tricks. The point is to indulge in some delicious scumbag wasting while saving a pretty girl.

Tradewest's boss Byron Cook enthused: "*Double Dragon* has all the aspects of a great movie – good guys, bad guys, a rescue, everything. Plus, there are very few people between the ages of 10 and 25 who aren't aware of *Double Dragon*." ■



Lotus cancels CD launch

Lotus has been forced to cancel a planned launch of a CD-ROM database containing information on millions of American consumers.

Lotus had hoped the CD would catch on with marketing companies, who could use the information to target consumers effectively. But the company had bowed to public pressure and canned the project. The CD was to be launched next month.

Lotus president Jim Manzi said: "Unfortunately we feel that there have been many wrong perceptions about the product. It didn't contain any information not already available through a variety of publicly accessible databases. It was developed in response to a real business need, particularly among smaller businesses."

He stressed that the CD did not include sensitive information such as credit history, or actual income. ■

BACK TO BASIC

A user group has been set up for fans of that most popular programming language – BASIC.

The BASIC Programmers' Group hopes to build up a library of programs written by users while encouraging further use of BASIC Founder Mark Blackall commented: "We'd like to encourage use of the program on all machines, allow the exchange of ideas and generally help the BASIC programmer."

He added: "Beginners are especially welcome." BASIC is so popular because it is based on real language, and is therefore simple to use. Call 0924 892106. ■

Computers in the jungle

Computers have reached the office, the home, the school, and now the jungle...

Missionaries in Papua New Guinea's most isolated villages are using Toshiba laptops to translate the Bible into the 700 or so local languages. Since the natives have no electricity, the missionaries have to rely on battery powered machines.

Most have turned to 12 volt car batteries, but a few are using solar panels. Some have invested in desktop machines such as the Macintosh, which they operate using gas powered generators.

The missionaries are from the Summer Institute of Linguistics, and they've written their own software which aids grammatical analysis by presenting on screen the source text adjacent to a translated version.

There's also a word processor which can handle languages which, unlike English, aren't read from left to right and which can deal with unfamilar characters and grammatical rules. ■

Slope off on-screen

It's that time of the year when all the jolly, fun loving sporty types slope off for a spot of skiing. But if you don't fancy the Alpine life there's always the safety of your computer.

Microvalue has relaunched old favourite *Winter Olympiad*, which features five different events, at a budget price.

You can indulge in some downhill racing in full 3D perspective, or there's the ubiquitous ski jump, try that most demanding event the biathlon, or slither down the slalom.

Braver people can have a go on the dangerous bob sled. 8-bit prices start at £2.99 while ST and Amiga owners will have to dig out £6.99. ■

Take a Tally

A new 24-pin dot-matrix printer, featuring a built-in automatic sheet-feeder, has been launched by Mannesman Tally.

Priced at a reasonable £359, the MT82 is, according to the company, targeted at computer users who need a low-cost printer which can make documents look a lot better than your average 9-pin. "It reflects the growing demand among dot-matrix users for laser printer type features," said the firm's Rob Lyszyk.

In draft mode the MT82 prints at 192 characters per second (cps) and in letter quality at 64 cps. It offers an 80 column width and a selection of resident fonts including LQ Sans Serif and Roman.

For more information call 0734 788711. ■

'MAD HACKER' DODGES JAIL

Appeal court judges have failed to decide if Nicholas Whiteley – dubbed the 'Mad Hacker' – should be sent back to jail for breaking into university computer systems, and allegedly causing thousands of pounds worth of damage.

Last year Whiteley, aged 21, was convicted of destroying hundreds of disks after hacking into university computer networks. He was sentenced to one year's imprisonment. However, Whiteley appealed and after one month in Brixton prison he was released pending the hearing.

At the hearing on January 22nd Chief Justice Lord Lane said the case would have to be studied carefully before any decision could be made. Whiteley claims that he only damaged information held on disks, rather than the disks themselves. He argues that information is "intangible" and therefore impossible to destroy. Lord Lane warned: "He should understand quite clearly that if the Court makes up its mind adversely to him, the chances are he will have to go back to prison. He must prepare himself for that."

Whiteley, a former computer operator, says he is desperate to clear his name in order to pursue his career. But he isn't optimistic: "I wouldn't bet a million pounds on it going my way. It's an uphill struggle to get our case across. Now it's up to the judges," he said.

PIC: COMPUTER TALK

Whiteley is banned from using computers and is currently living at home and unemployed. ■

What's the Difference?

The man in the suit is Mr Tim Renton, Minister for the Arts. He's lucky enough to be allowed a fondle with the Science Museum's famous reconstruction of Charles Babbage's Difference Engine.

The Science Museum has confirmed that the Engine will be ready by July when it will take centre stage in a special exhibition celebrating Babbage's 200th birthday.

Babbage designed the computer in 1830 but, due to a lack of funds, could not complete the construction. The Science Museum is spending thousands of pounds on the computer to see if it would have worked. The exhibition will run from July 1st until January 1992. ■

It's the ultimate computer program

This piece of kit (below) would set you back £20 million and is capable of wreaking unspeakable chaos. Highly trained Tornado pilots rely on highly trained computer programmers to get the most out of the machine.

Tornadoes have been involved in hundreds of sorties in the Gulf over the past few weeks, and every one is the result of hours of computer programming.

Before each mission programmers key relevant information, such as flight plan and position of enemy defences, into their computers. A disk is then transferred into the Tornado. The computer actually flies the plane, and it's the pilot's job to make sure the aircraft is following the computer's instructions. The only time he takes over is when he's attacked by the enemy.

Group Captain Bill Hedges, who commands a detachment of Tornadoes said: "The computer is central to the Tornado's flying capabilities, and is the main reason our low-level bombing missions have been so successful." ■

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Amiga Series
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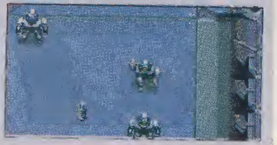

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Trap for BASIC errors

A new utility will make it easier for BASIC programmers on the Amstrad CPC to trap errors. It will also be useful for spotting the invariable mistakes that slip through when typing in magazine listings too.

KWIKREF/X from Parmigold looks at a program and writes a report to the screen containing a sequenced list of variables and their locations. Lines with changed values are marked for attention.

A further table gives a list of lines referring to other lines which provides a cross referencing grid. KWIKREF/X costs £12.95 on three-inch disk and is available from Parmigold on 0666 837215. ■

Scots show

The Scottish Computer Show will be welcome to those people north of the border fed up with having to travel south to London or Birmingham to see the latest in technology.

The show is at the Scottish Exhibition and Conference Centre in Glasgow on February 26-28. There are hundreds of stands booked with exhibitors as diverse as computer companies, publishers, and service organisations.

The Data Protection Registrar's office will be represented offering advice to individuals and businesses. And there should be a few bargains for the computer shopper. ■

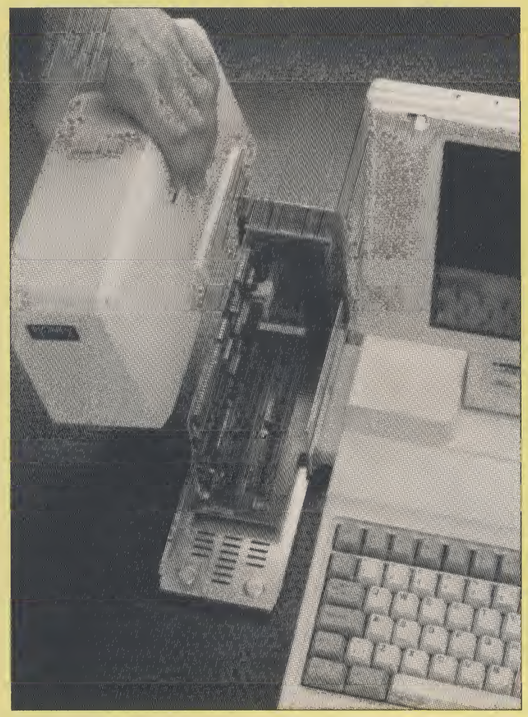
Design on special disks

A range of removable hard disks for Atari PCs and a large scale monitor for the Atari TT is available in the UK from German Atari specialist Elektronik GMBH .

The ProGate external hard disks are available in capacities from 20-440Mb and are all designed in house at Elektronik's Berlin research laboratory.

Software provided with the drives allows 12 partitions per disk, selectable boot partition, write protection and password. There are also compatible tape streamers available for the disks and similar models available for the ST.

Elektronik is on 010-49-30 391 20-02. ■



• Elonex: storage.

Data hungry laptop

An enhanced 386sx based laptop with 100Mb of storage has been launched by Elonex.

The £1,695 LT386SX/P weighs in at 6.5kg and has a 16MHz 386sx, VGA mono display, 1.44Mb floppy, a mouse and supplied with a carry-case, MS DOS 4.01 and Windows 3. More details from Elonex: 081-452 4444. ■

Under £1,000 and in the Hig St

IBM SET T
LOW COST

IBM is set to launch a 386sx version of its low cost PS/1. The firm is understood to be aiming at a sub £1,000 price point with the existing 286 based PS/1 dropping in price.

PS/1, which was launched six months ago, has achieved some success among home and small business buyers. It currently costs £999 and is available through High Street stores such as Dixons.

The move is being seen as a direct response to Apple's success with its low cost Classic which, in its popular hard disk configuration, costs just under £1,000.

The PS/1 386sx is likely to come with a free copy of MicroSoft's 'Mac like' operating environment Windows 3. This would make the machine a low cost Windows workstation and an attractive option for computer buyers looking for power without an outrageous price penalty.

Dealers are predicting that the machine will be launched within the next two months with stocks available almost immediately. To run Windows the PS/1 386sx must come with 2Mb of RAM on board, and a 40Mb hard disk is almost certain to be included. The 386 chip will allow to machine to run at a nippy 16MHz.

Both IBM and Apple are keen to win a large share of the home and small business computer owner in Europe and the US. Sales of the PS/1 have been satisfactory since launch, although it is Apple's Classic which is attracting the most buyers.

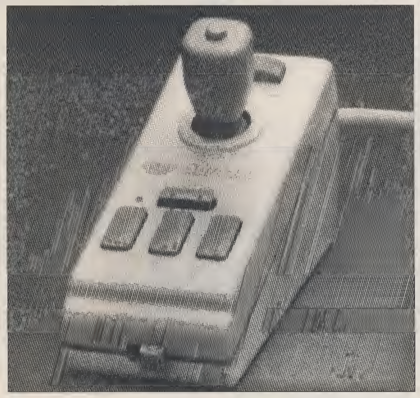
IBM is hoping that keen pricing, with the advantages of

Take control

Amiga owners will soon be able to invest in a useful hand-held mouse device, currently only available for PC users.

The Icontroller fits in the hand, allowing you to control your curser without taking up valuable desk space. You can move the curser with a press of the thumb, and it's easy to get at the mouse buttons.

The Amiga version should be out within a few weeks, retailing around the £60 mark. Call manufacturer SunCom on 0453 753565. ■



Name that voice

A voice recognition system which will be used for identification purposes has been launched.

Users must speak into the device, which will take about 10 seconds for the computer to recognise the speaker. Manufacturer British Technology claims the rate of false rejections is as low as one per cent. ■

Computer system to stamp out fraud

A software company believes its new computer system will help stamp out credit card fraud by analysing people's buying habits.

Xpertscore from Leigh-based Attar Software deals with patterns of fraud both in applications for credit cards and the use of cards by a person other than the account holder.

Managing director Akeel Attar says fraudulent credit card applications are a major problem for stores which issue their own credit cards: "The problem is people apply for credit when they can't afford it. They use the card extensively over a period of a few days and are then untraceable because the address given is false. The program analyses data patterns from a series of examples of credit card fraud. It then identifies patterns showing the policies and techniques used by fraudsters."

Transaction fraud as a result of loss or theft can also be tackled by the system. "Patterns of card use can be analysed for each customer." says Attar. "A card that's normally used for petrol or restaurants and is suddenly used for a trip to Harrods will spark an alert as it doesn't fit with its normal pattern of use. In these cases the account holder can be notified and the item checked to ensure it's a genuine purchase."

A BarclayCard spokesman confirms the need for controls on credit card fraud: "Fraud is a significant problem. The figures for 1989 showed a loss of £15 million on credit card fraud with Barclays.

He agreed a system to analyse patterns in data would be a effective way of dealing with the problem. "People tend to fall into a more set pattern than they realise in credit card use. You must ensure you have a genuine case as a spending blitz for holidays or birthdays is not uncommon.

"There are, however, certain patterns of spending and certain patterns of fraud. A data analysis system could well prove cost effective in detecting when a credit card has been stolen." ■

gh Street in bid to bring buyers back

TO LAUNCH ST 386 PC

standard compatibility, a fast processor and the easy to use Windows environment will bring buyers back.

Some have criticised the PS/1 for being too little too late. But a more powerful model and a downward adjustment in the pricing of the original will strengthen IBM's position. David Smith of official IBM dealer Worldwide Computers commented: "People say the PS/1 is expensive, and can't be expanded. But if you include the extras that come with it as standard, it's actually very competitive with many low cost 286 machines."

A spokesman for IBM refused to comment on the situation. "We haven't announced anything, and we don't speculate on forthcoming product." he said.

• *PS/1: faster model coming soon.*

• *STFM: now in stereo*

Sound out ST in stereo

A new £29.95 cartridge allows the ST to play back in glorious stereo and takes advantage of new software written with stereo capability.

Stereo Playback from Microdeal contains a 2 channel drum sequencer which lets you have up to 15 sampled drums and up to 50 drumbeat patterns in memory at one time. This allows you to to assemble the patterns into songs of up to 99 patterns. 10 songs can be held in memory at once.

There's also a Stereo demo driver for the Quartet sequencer, and routines to assist you in writing stereo sound into your own games. More information from Microdeal on 0726 68020. ■

Professional PC package

The *Top Copy Plus* word processing package for the PC has been upgraded to *Top Copy Professional* for 1991. The new version offers page preview, on-line thesaurus, and newspaper column type display as well as HP soft font capability.

A further feature is a spooling save as you type option that avoids accidental loss of documents in the event of pilot error or power failure.

Top Copy Professional costs £228.85 and there are upgrade prices available to users of *Top Copy Plus* and *Top Copy Professional*. Call Top Level Computing on 0453-753955.

From the makers of Amiga Format

IF ONLY THERE WAS SOMEONE WHO COULD TELL ME WHICH SOFTWARE TO BUY
GET THE ANSWERS

• **Amiga Format:** ***Now there are three***

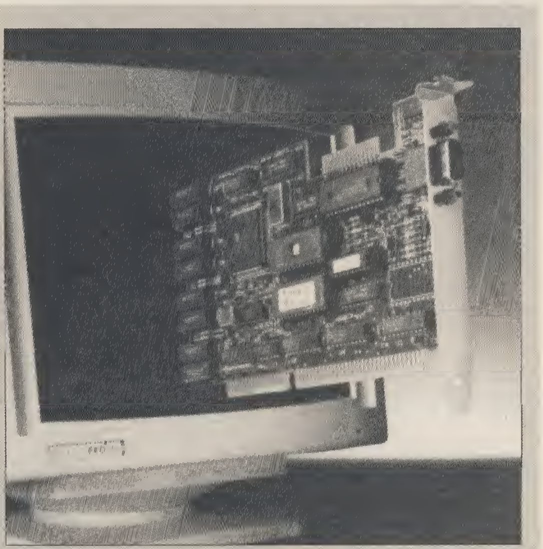
In the wake of *Amiga Format*'s extraordinary success, two more Amiga magazines are to be launched by Future Publishing.

Future, also responsible for *NCE*, says *Amiga Format*'s 80,000 plus readers are demanding magazines with specific themes. The first will be a "total games exclusion zone" called *Amiga Shopper* which will be aimed at the serious Amiga user who is interested in programming, public domain, productivity, buyers guides and, most importantly, bargains.

Amiga Shopper will be edited by former *Amiga Format* editor Bob Wade and will cost only 99 pence. A sneak preview sample will be distributed free with the April issue of *Amiga Format*, with the launch proper in May.

The second mag, *Amiga Power* will be 100 per cent games based, with colour throughout. It will cost £2.95 and will come with a complete and "very high quality game" free on the cover every months.Two editors with many years experience in the games market will be combining forces to bring *Power* into being. Matt Bielby transfers onto the title, vacating the editor's chair on *Your Sinclair*, and Gary Penn, until recently editor of *The One*, will be a consultant.

Publisher Greg Ingham fended off fears that *Amiga Format* would be harmed by its two offspring: "You'd have to be a madman to do anything which might harm *Format*. It is the fastest growing computer magazine of all time on sales, and it's still growing. As in the past *Format* will continue to cover all aspects of the Amiga, but readers have said they want specific magazines too, and we agree."



• *Big deal: monitor and graphics card together.*

Citizen offers an easy life

Monitor buyers might do well to check out a nifty little concoction offered by peripherals manufacturer Citizen.

Bargain hunters will be offered the Procard 816 graphics accelerator when they buy the ProCM14i 14-inch colour monitor. The price for this twosome is £899 representing a saving of 12 per cent.

"The combination will offer buyers a total display solution," said Citizen's Simon Cooper. "It makes life easier because the buyer is assured of operational compatibility." ■

Cheap and simple offer going Loco

A new version of Locomotive's PC wordprocessor *LocoScript* was launched last week.

Version 1.5 now includes split screen editing, pop-up keyboard diagrams, phonetic spelling correction, selective spelling checker, ability to search for a file or directory from, the disk manager and the facility to control whole directory trees.

LocoScript was orginally launched for the PCW and is used by millions. The PC version was released last May to general satisfaction.

Locomotive's Chris Hall said: "For just £125 it delivers a powerful range of word processing features, and an impressive integrated database and mail merge facilities."

Upgraders are being offered cheap and simple options for getting their hands on the program.

Call Locomotive on 0306 740606.

THE WEEK IN VIEW

Renegade publisher Tom Watson argues for quality, before big name licenses...

Software publishing has come a long way in its short life. Seven years ago, companies (or more frequently individual programmers) exhibited their wares on trestle tables at informal shows and sold their games in unsophisticated packaging. Nowadays, their operations are substantially more sophisticated with multi-million pound marketing spend, international conferences, high-profile brands, one or two of them even own a fast car. Software programmers are nowhere to be seen.

So, as the industry developed its commercial skills, something was forgotten along the way: the games themselves. Original products started to take second place to licences. Slowly but surely, marketing muscle began to tell and companies engaged in buying wars to see who could gain the supposed top licence.

To many publishers, original products became less important. Some publishers will even admit privately to the 'empty box' scenario – when the licence is felt to be so strong that they don't feel that it matters what is in the box. The industry has started to take too many lowest common denominator decisions.

This carries many dangers:

- If publishers don't push themselves to produce the best games, consumers will all too soon weary of a stream of repetitive products, and buy less.
- Developers become starved of investment for the creation of new work, being strongly 'encouraged' instead to work on licensed material.
- As the future of optical/console systems beckons, a reliance on the intellectual property rights of others will leave our industry starved of creative ambition.

We must be prepared to recognise that we contribute to an industry which is seen throughout the world as having the finest 16-bit development talent. That talent needs stronger and more positive creative direction from its publishers. It needs to be encouraged to work, on a creative basis, with other entertainment industries. To deny or hamper that creativity will ultimately lead to a dependance on the creativity of others, exploiting their work, rather than creating our own.

The status of the developer must be enhanced, the relationships between developer and publisher must improve (another subject) and we must all start to recognise what is really valuable to us – the consumer. ■

Radio bits

Apple is developing a radio-based network to transmit Appletalk-compatible data in the US.

It has already requested permission to use bandwidths from 1850MHz to 1990MHz of the radio spectrum for Data PCS (Personal Communication System). It will transmit data at up to 10 Megabits per second at distances of up to 150 feet.

NCR, which has a comparable system, called Wavelan, running in the states has been refused a licence to set it up in the UK. ■

Gulf War threat to 386 chips

The Gulf War could result in a severe world wide shortage of silicon chips.

Intel, one of the world's leading chip suppliers, has its sole source of 486, 386DX and 386SX chips in Tel Aviv. Further missile attacks from the Iraqis on the Israeli capital would almost certainly halt all production.

The company has begun taking precautions by moving 486 production to the US, but there are no firm plans for alternative manufacturing sites for 386 yet. ■

• Tel Aviv after an early Scud attack.

Amstrad's popular computer deal

PCW PRICE SLASH

• PCW: new lease of life.

Amstrad has slashed £80 off the price of its entry level business computer the PCW 8256.

The machine, which many say brought serious computing into the home for the first time, is one of the best selling computers of the past five years. A £1 million national press advertising campaign has been promised, confirming Amstrad's continuing belief in the PCW.

The £299 price point includes keyboard/monitor unit and a printer, and, as always, the PCW comes with word processing package *LocoScript*.

Amstrad's latest price cut has fuelled speculation that the company is making room for a complete re-launch of the PCW range. A 1990's version would probably feature 3.5-inch drive instead of the tradtional (and outdated) 3-inch drive. However, spokesman Nick Hewer said he knew nothing of any such launch, adding that it would definitely not happen before the autumn.

He added: "The 8256 has always been a big seller. The price cut and ad campaign will act as a stimulant." The PCW range is thought to have sold a good deal more than one million since its launch five and a half years ago.

No promotional plans have been announced for the high end PCW machines.

Meanwhile, Amstrad is preparing for a triple launch at the Hanover Messe in a few weeks time. Smart money is being put on a 486 (probably called the PC5000) and a couple of high-end portables. The PC4000 low end IBM compatible may be launched, although that could be held back until the autumn. ■

Bringing Hubble into focus

Computers have been brought in to rescue the reputation of the Hubble space mission.

Specially-developed computer techniques are now digitally focussing the blurred images which the $1.5 billion telescope has been sending back for the past few months. Instead of helping scientists discover new astronomical phenomena much of the information from Hubble had been virtually useless, because of a basic design flaw in the telescope's mirror.

Now the telescope is sending back the crystal clear images of planets in our solar system as well as new information on stars almost 170,000 light years away. ■

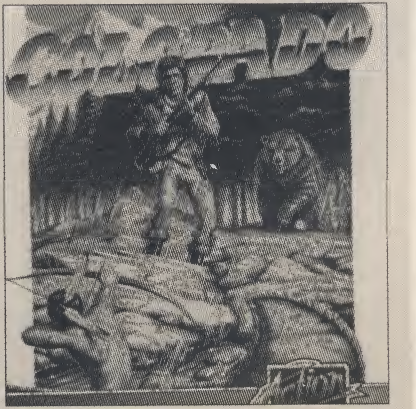
Budget 16-bit action

Digital Integration is releasing *Super Gridrunner*, *Colorado* and *SDI* on its budget 16-bit label, Action 16.

Colorado is a western adventure pitting you against 'Injuns' and wild animals. A love story set against the background of international espionage provides the premise of *SDI*. If science fiction 'shoot-'em-ups' are more your taste then *Super Gridrunner* will provide all the action you need as you fly a Vorton Hyper X-13 star fighter to save the earth from the "evil Slimelords of Xtharrgg".

All three disks are out now for the Atari ST and Amiga, *Colorado* also being available for the IBM PC. They each retail at £7.99.

Digital Integration has also, finally, issued a Spectrum version of the acclaimed game *F-16 Combat Pilot*. This classic flight simulator, with five missions, variable weather conditions and laser guided weaponry, is due in the shops now. The disk version costs £19.95 and the tape retails at £14.95. ■



• Colorado: Wild West action.

Move up with a cheap 486

If you're looking to move up into the world of 486 PCs you can normally expect to pay a lot of money. However, Berkshire based Factotum reckons it has the best deal with a sub £2,000 machine launched this week.

The firm says its 486/25 costs less than half the price of IBM's own machine, and is "hundreds of pounds" cheaper than any of its competitors.

The basic Factotum 486 comes with a mono monitor, 4Mb of RAM (expandable to 16Mb), a 32-bit memory slot with a hard disk boasting 80Mb capacity. Digital Research's DR DOS is supplied together with a free spreadsheet. Call 081-336 1282. ■

Dealers told to dispose of old computers and offer £70-off deal

TRADE IN YOUR 8-BIT FOR A NEW AMIGA 500

Buyers of Commodore's Amiga are to be offered an impressive trade-in deal on their old computers.

Anyone can swap their outdated machine for a £70-off deal on the Amiga. Dealers say the offer is open ended and will include games consoles and dilapidated computers.

The £70-off plan will bring the price down from £399 to £329. While dedicated users of 8-bit machines such as the Speccy and C64 will be horrified by Commodore's announcement, genuine computer users looking for a good deal will be attracted.

The dealers have been instructed to dispose of old computers, but Commodore says it would be nice if they were given to charity. Commodore's Kelly Sumner said: "We can't force the dealers' hand, but we have given them that option."

Cynics in the trade were last week claiming that the Amigas are old faulty returns which had been fixed and were being dumped back into the market. Sumner assured *Express* that this was not the case adding: "That is totally illegal, and we would not do such a thing." The Amigas on offer do not include the free software packs.

• *Amiga: tasty trade-in deal.*

Meanwhile, the mid-range Amiga 1500 pack has been cut in price by 15 per cent – effectively changing the £999 plus VAT to £999 including VAT.

Commodore has also announced its middle of year financial results showing that the UK operation is performing better than anywhere. Sales were up more than 50 per cent in the UK for the period running up to Christmas (on the same period in 1989). Chairman Irving Gould said Europe now represents 85 per cent of Commodore's worldwide business. In contrast the American operation reported a 97 per cent drop in earnings.

He also claimed that the new PCs introduced last year had performed well, but said it had been the Amiga's success which had represented an upswing in sales and profits. More IBM compatibles are expected to be launched in the UK within the next few weeks. ■

From another planet . . .

The third issue of Californian New Edge computer magazine *Mondo 2000* has hit the UK. The more Virtual among you will remember *Mondo* for its off-the-wall approach to computing and its plain weirdness.

This quarter's issue features reviews on hardware, software, graphics and computer art, debates on Virtual Reality, interviews with strange new-tech types and lots of laughs. The publishers say it's one for computer literate dissidents.

You can pick it up from Virgin Megastore in Oxford Street, London or Forbitten Planet in New Oxford Street, London for £4.75. ■

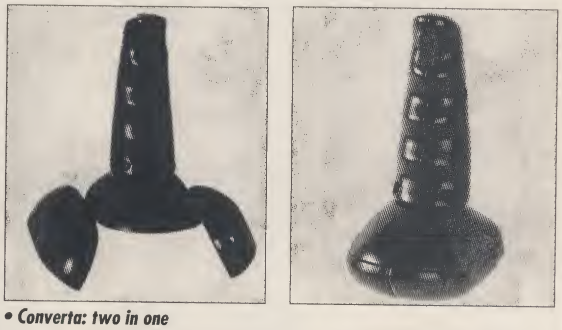
• *Mondo 2000: strange*

Unix ST?

Atari is believed to be preparing for the launch of a high-end ST running Unix.

A spokesman for the firm confirmed that launches are in the offing, and said the company is looking closely at Unix. He could not, however, comment on speculative talk that the machine would be 100 per cent downwardly compatible with the ST.

Meanwhile, expectations are growing of a new pricing structure for the whole ST range. The spokesman refused to be drawn on this speculation. ■


• *Converta: two in one*

Open and shut joystick

It's the world's first convertable joystick, and it's being launched this week.

Converta allows gamers to choose between hand-held use and table-top use, giving you a little advantage depending on what your style happens to be.

Converta is manufactured by KPK (a Welsh firm set up by computer industry veterans). It's compatible with most home computers, and it costs £9.99. Call 0495 302968. ■

• *The London International Group, famous for the manufacture of rubber gloves and Durex condoms, has just splashed out £200,000 on a new computer system designed to improve the making and testing of its products.*

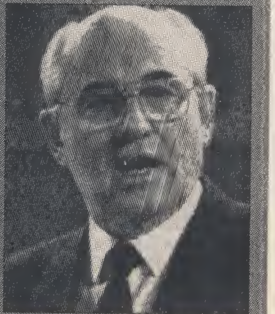
The IBM based system replaces an outdated mainframe, the company says the new machines will "provide greater flexibility for users".

Soviet silicon valley planned

Senior executives from top American computer companies have been visiting the Soviet Union recently for meetings with president Mikhail Gorbachev.

The Soviets are keen to set up a new "silicon valley" in their own country and are seeking advise from firms such as IBM and Apple. In turn, the Americans are looking for Gorby to throw some business their way.

Six possible sights have been chosen, and a final decision should be taken later this year. ■


• *Gorby: in with IBM and Apple*

Society of Software Authors holds second annual conference

BLEAK FUTURE FEARED FOR GAMES WRITERS

by Dave Golder

At the second conference of the Society of Software Authors (SSA) games writers voiced fears of a bleak future with little creative control and sweatshop working conditions and admitted that the initiative for change will have to come from themselves.

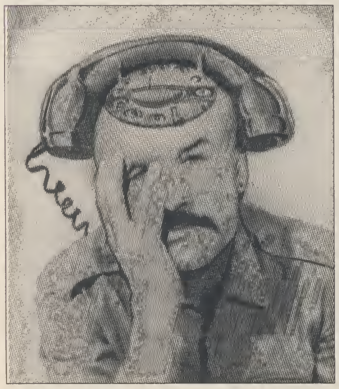
Software writers are in danger of ending up salaried skivvies working on formularised projects in publishers' sweatshops unless they get their act together and take a more professional approach to their work, the SSA claims.

At the Bournemouth conference the resounding message from speakers was: "The writers have got to prove that they can work professionally or they will never get a good deal from the publishers."

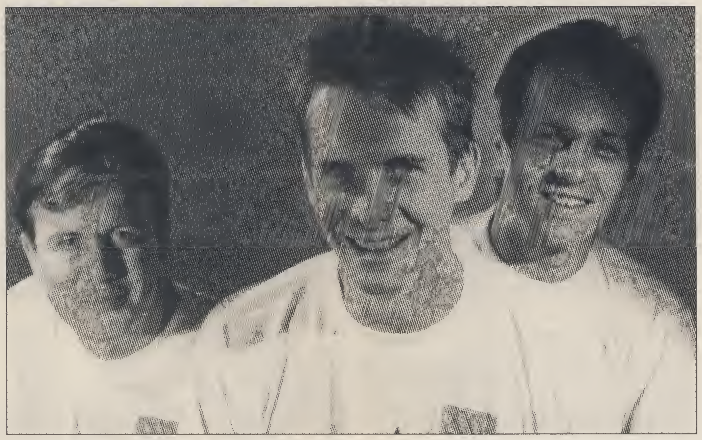
As SSA Chairman Jon Dean put it: "A lot of software writers aren't even aware that they're running a business. Authors are good at programming or graphics, but that doesn't automatically give them the skills at negotiating a contract. Publishers can handle this side of things much better because it's part of their business and they're doing it all the time."

The speakers also emphasised that a business led software industry would inevitably lead to a raw deal for the consumer, who would have to put up uninspiring games and endless sequels.

Mel Croucher, software writer and industry veteran, painted a particularly dark picture in his speech, coining the sweatshop analogy which was to crop up as a theme in many of the following speeches. He fears that if current trends continue, authors will soon have little creative input into games and most will instead be reduced to writing short routines or animated sequences handed down to them by the publishers.



Industry veteran Mel Croucher casts some very gloomy predictions at the conference about writers submitting to the beck and call of the publishers.



• Tom Watson (right) with the Bitmap Brothers: good business sense could preserve their distinctive style of games.

Although opinions varied on the extent to which this hypothesis would be realised, most agreed that the general idea was looming ominously.

"I think the situation is here to some extent at the moment," believes Dean, "You have a few the well-known programmers like Renegade's Bitmap Brothers who are largely free to do what they want, but the majority of creative people have to take whatever they can get."

The SSA is a voluntary body which was set up three years ago with the intention of achieving a better deal for games software writers. At the moment it has around 50 members, an annual AGM every March and publishes a quarterly newsletter, *Blit*. New members have to sign a 'Declaration of Responsibility'. Dean reckons that the main function of the society is "to help the writers help themselves," but it is keen to stress that it is not a union.

> **"We're not out to call a strike or hold a gun to the publishers' heads"**

"We're not out to call a strike or hold a gun to the publishers' heads," asserts Dean. "We've got to achieve our aim with the support of the publishers, acknowledge that there can be faults on both sides. We want to end the situation where publishers and authors work in isolation and blame anything that goes wrong on each other."

The feeling at the conference was that there are two main ways that the authors can help themselves improve the situation. Tom Watson of Renegade spoke of the value of authors developing an identity so that their own name would become the marketable commodity. Using the example of Renegade's own Bitmap Brothers, creators of *Xenon* and *Speedball*, he argued that if the games buyers know who wrote their favourite software as opposed to simply who published it, this would create a kind of brand loyalty, such as with fans of one game written by the Bitmap Brothers eagerly awaiting the next.

He believes that this will give the authors more bargaining power when it comes to negotiations with publishers. "So the companies might just lose a little of their power, but in the end result is a situation which is better for both sides."

Dean agrees to large extent, but points out that The Bitmaps actually have a major stake in Renegade, and "there's a big difference between developing your own identity and having your own label."

He doesn't feel that authors have to go this far to succeed. "There is more positive than negative to come out of having an identity. More authors get coverage now – names on boxes, mentions in magazines. We are pushing to have them credited at the annual industry dinner. When the awards are read out I would like to hear "The winner is *Captive*, from Mindscape, written by Tony Crowther."

He doesn't think that developers having an identity is necessarily at the expense of the publishers. "Take Bullfrog and Electronic Arts. Bullfrog has written some very good games, the quality shows through and the consumers have recognised that. It has been a good move for them both." But at the same time he is not convinced of the value elevating writers to star status. "Authors aren't usually as good looking as pop stars."

Dean's own view is that authors simply need to take a more professional approach to their work, and stresses that one of the main functions of the SSA is to help them do just that. "The aim of the conference was about teaching them the business side of things. If they can negotiate a better deal that's a start."

His own talk was about the need for authors to impose business management techniques on their writing schedules and he emphasised that it would be to their own advantage to be honest both with publishers and with themselves when it came to discussing the amount of time a game will take to write.

"There are publishers who will claim that they have been ripped off just because a game has been handed in late. This is just down to bad business management. It is hard for authors to admit that they might take longer than the ideal length of time to write a game. What both sides need to do is plan better."

Dean is pleased at the way the conference ran. "It was probably about 150 per cent better than the last one and hopefully the next one will be 150 per cent better than this one."

He was also pleased to see representatives from four of the major publishing companies there, including Microsoft and US Gold and believes that the society is finally gaining recognition. "We recently had a meeting with ELSPA – the publishers' association – and it has agreed to support us, so I suppose that means that it has officially recognised us.

"Getting our message across has been hard as people tend not to take us seriously. We find it hard to get coverage, but finally we are seeing change."

So while the SSA is not a pressure group making a song and dance, demanding rights for authors, Dean is convinced that its long term approach working in conjunction with, and not against, the publishers is proving successful. "Change will only come if all the people involved on both sides put as much effort into it as possible and the results will be better for both the consumer and the industry."

The SSA helpline is on 0867 35485.■

Jon Dean, SSA chairman: "We must help software authors to help themselves."

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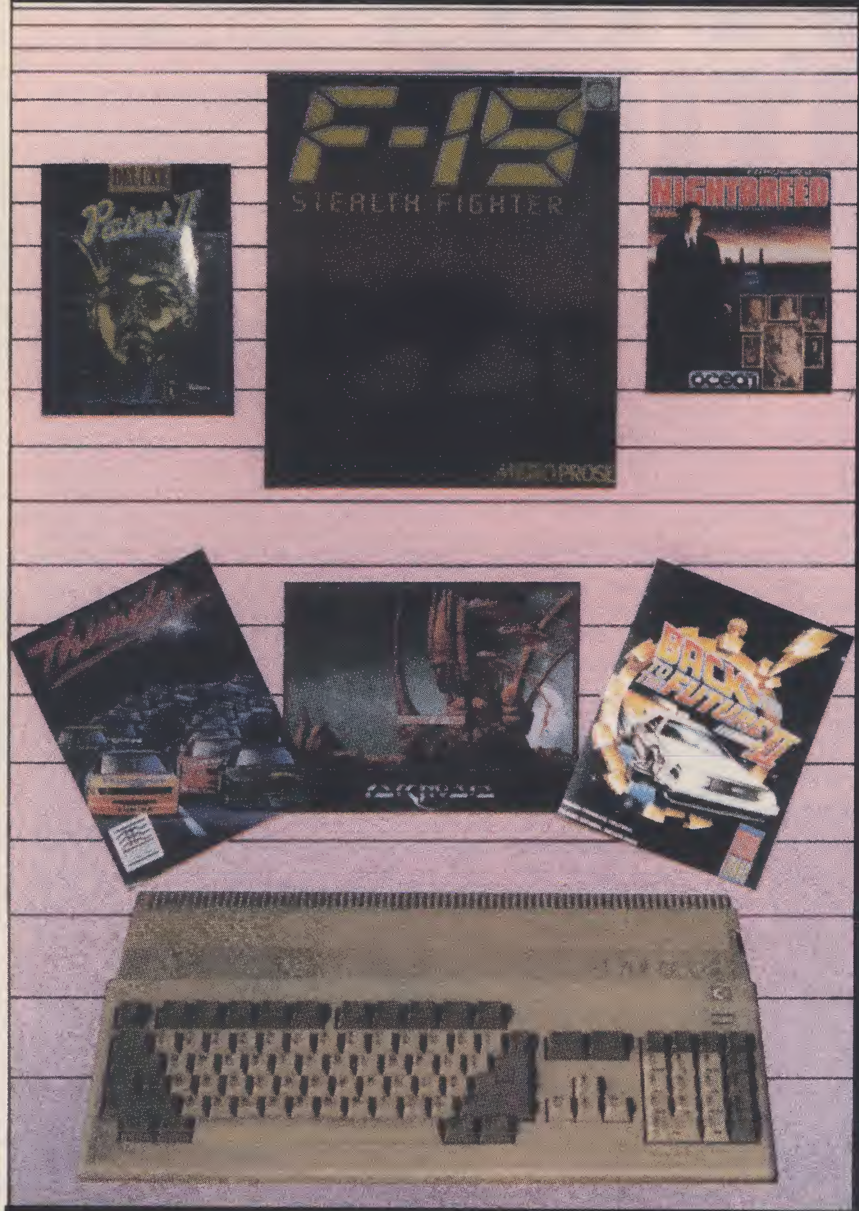

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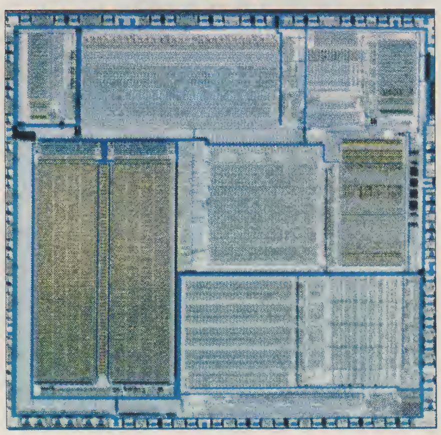
SUPERSONIC COMPUTING

Supercomputers are breaking new speed records every day, but how do they do it and can the same techniques work on your machine?

The overriding criterion to influence computer design ever since the first mainframes lurched into life in the Sixties has been speed. The search for faster and faster machines has continued for the last decades, finally resulting in the supercomputers we know today.

But the quest for speed has not ended; indeed if anything it has intensified in the last few years. As the potential of simply boosting the computing speed by creating faster hardware has bottomed out due to the limits of the laws of physics, alternative approaches have been brought in to action. These approaches centre around different computer architectures. 'Architecture' is the name given to the layout of components of a computer, but more importantly it defines the way data is transferred and processed by the machine.

The original computers were sequential; the processor received its instruction from a program, it then input the data from memory, processed it according to the instruction and sent the result back out to memory. The first enhancement to this came in the form of pipelining. A processor consists of several parts; the bit which gets the instruction, the bit that gets the data, the bit that does the processing, and so on. Using pipelining, while one part of the chip is processing an instruction, another part is loading the next one in ready to be done. This can speed up operations enormously.



• The Inmos T-800 transputer is the powerhouse behind many parallel processing computers; you'll find these inside the ATW and they can be fitted to PCs and TTs.

One step further on than pipelining is vector processing; in this case when a set of instructions are to be applied to a large amount of data each step is performed simultaneously on all the data. This is speedier than taking each piece of data individually and putting it through the complete set of instructions, as the processor can be optimised for each instruction and does not have to reset itself for the next until all the data has gone through. Vector processing is the most common architecture in supercomputing systems.

To increase performance over vector processing systems requires a radical change in the machine's architecture. No longer is one processor enough; instead the problem is broken into several parts which can be worked on simultaneously. The processors in machines like this operate in parallel, and communicate with each other to transfer data and to allocate pieces of code to each other.

With a parallel processing computer the power is only limited by the number of processors, called nodes, which you add. Thousands of these chips can be strung together, and even if the individual processors are not that powerful, the net effect is stunning. Take the Sigma system, a parallel processing computer consisting of 2,048 i860 processors, each one as powerful as a 486, combining to give awe-inspiring power.

The problem with this kind of machine is programming it. The problem must be analysed in such a way as to be broken down into constituent parts which can be calculated by the nodes. The code to make sure that the nodes communicate with each other properly also needs to be written. Conventional sequential programming methods cannot be used; you need special compilers, but more importantly alternative ways of looking at problems.

These parallel architectures are coming to home computers. The way the Amiga works with its custom sound and graphics chips approaches parallelism, but it is Atari which takes the prize for bringing the technology to the desktop. The Atari TT is to have a card which can contain up to four T-800 transputers working in parallel, similarly a new version of the Atari Transputer Workstation will allow several T-800s to be wired together. In the PC world, expansion cards are available which contain up to eight parallel processors. Some manufacturers have also started to build multiple 386 processors into their file server machines to increase their power. All these systems require special software; conventional software won't run any faster with a parallel processor board.

The power of parallel processing cannot be long coming to home machines. Imagine the games machine which could be built; one processor handling the graphics, another dealing with sound, a third working out whether your shots had hit, and a fourth loading in the next level from a disk, all at the same time, all at high speed. The cost of microprocessors is now so low that there is no financial reason why this could not be done; perhaps by the year 2000.... ■

GLOSSARY OF SUPERCOMPUTING TERMS

ARCHITECTURE: The arrangement of processors, memory and communication links which makes up a computer.
BOUDOIR: Each parallel process accesses only its own memory.
CLOCK CYCLE: The speed at which instructions are performed by the processor. The current record holder is NEC SX-3 with 2.9 nanoseconds.
DANCE FLOOR: Each parallel processor can access all the others' memory.
DISTRIBUTED COMPUTING: Several supercomputers with different architectures linked together, the appropriate machine being used for each kind of task.
GALLIUM ARSENIDE: Material for making microchips which can operate considerably faster than ordinary silicon. Expensive to manufacture.
HYPERCUBE: System of linking parallel processors to three neighbours, all further linked as if at the corners of a cube.
MESH: Interconnections between nodes of a parallel supercomputer.
MIMD: Multiple Instruction Multiple Data: A system whereby each parallel computer element has its own program. Much faster than SIMD, but very difficult to program.
NODE: Processor, often with its own memory and instructions, in a parallel supercomputer.
PARALLELISM: Rather than make one processor that runs faster, split the problem into several parts which can be worked out simultaneously and have a number of processors working together to solve the problem.
PIPELINING: A system whereby different parts of a processor can work on several problems simultaneously, starting the next one before the first has been completed.
SIMD: Single Instruction Multiple Data. A form of parallelism where the instructions are held in a single program which works with several sets of data at once using several processors.
TERACOMPUTER: a fictitious supercomputer with a terabyte of RAM, a teraFLOP of computing power and a data transfer speed of a terabyte per second. At present no-one has got close to a machine of this specification, but work continues apace.
TRANSPUTER: A kind of processor which can be linked together to form a parallel system. Inmos manufactures the most common, the T-800.
VECTOR PROCESSING: If a set of operations are to be performed on a large amount of data then each operation is done on all the data simultaneously, rather than taking the process to completion for each one. The architecture of 'standard' supercomputers.

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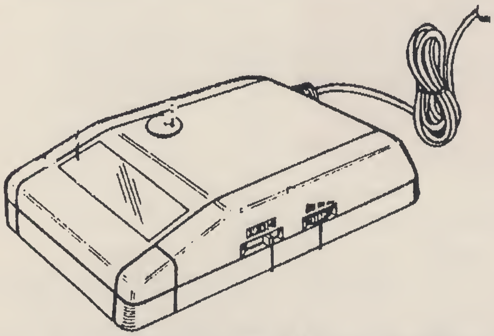

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With your host Haydn – the man with the fivers to give away

■ Veiled threat?

Regarding Alan Gilholm's letter in *Express* 114 in which he complains about the use of the phrase 'Rich Bastard' I'd like to point out that this is not an isolated use of bad language. In particular, your ex-columnist Steve Carey was prone to certain choice words that in no way can be called 'a term of mild derision'.

In your reply, you made the point that in the case of 'RB', it injected humour into the article. Did it need this humour? Surely an equally 'funny' phrase could have been found?

In my capacity as computer editor for the children's paper *Early Times* I often redirect my readers to magazines to allow them to study articles in more depth than I can give. The article in concern would have been superb for reference (bear in mind that *Early Times* has a circulation of 50,000) and could have increased your sales. However, I could hardly recommend it to 8-14 year-olds with that term. Yes, I admit that they used language like that – and worse – in the playground, and I am no proponent of censorship. However, it has a more dramatic effect when written – particularly by people that they may look up to.

I do take all your points into account, but must agree with Mr Gilholm and say that the swearing in that case was far from necessary.

Incidentally, any of your readers who fancy a new computer may like to know that *Early Times* gives readers the chance to win an Atari ST every week.

Peter Orme, Computer Editor,
Early Times

I'm always very suspicious of people who start to make a point with phrases such as 'In my capacity as...' Peter – they're generally about to say some kind of 'positional power trip' on you (as my hippie brother used to say).

And the only trouble with the pseudo penalty we incurred by not being recommended to your readers was that by the time you had rushed into print with a recommendation to buy a copy of *Express* and the Gamers' Guide, it would almost certainly have left the newsagents' shelves and been replaced by the next issue!

Still, you make some fair points (especially about ex-seminary boy Steve Carey) and in the interests of glasnost I've let your plug slip through the net..

H F-W

■ Video naughties

Express has always taken a laudable stand against piracy of software, and the breaking of copyright laws – for this, you are to be commended.

But with this in mind, surely you should be against any action that involves a breach of copyright, and not only that concerning computer software? A few adverts have been published recently in the Goods Wanted section of *Shopping Express*, requesting home video recordings of programmes from BBC and BSB television.

Surely, this is inviting a breach of copyright? I was always under the impression that it was OK to record off-air for your own use, but that it was not permissable to record a programme and then cause it to be heard or seen by others, re-recorded or sold.

Surely, if you're against one type of copyright infringement, you should not condone or enable others to take place?

Steve Lee, Ramsey, Cambridgeshire

PS. Did anybody notice Tracey learning to word process on a CPC 6128 in *Birds Of A Feather* prior to Christmas? And if they did, could they tell me where the 'EXIT' (sic) key is on a 6128?

You've got us bang to rights there, Steve, and we can't even claim that society is to blame. Those video ads just slipped through while we were distracted by the giant pile of adverts offering pirate copies of games. They won't appear again.

And maybe we'll start forwarding these dodgy ads to FAST rather than just binning them – so take heed, you would-be pirates out there. Meanwhile, have a fiver for reminding us of our moral obligations (and spotting that 6128).

H F-W

■ Scuppering pirates

Where I live there is a large network of hackers – they belong to a club that pretends to be a 'law abiding' computer club, but it isn't.

I know some people who belong to this club and hack games – and I also know who supplies the club with a lot of the goods (games to hack, etc). This network is a pretty bad thing, and I have been thinking about telling FAST about it for a long time, but have never brought myself to do it. If I did tell FAST about this illegal racket, what would I have to do? Just make a phone call, or would I have to give FAST some substantial evidence? Also, would there be some kind of reward?

I own a Sega MegaDrive and buy all my games. If I buy my games, why shouldn't other people who own computers buy their own games?

Anon

Exactly. It's dead simple mate. Give FAST a ring on 0628 660377 and they'll explain what's needed. It's highly unlikely that they will ask you to get involved in undercover operations – just a few basic details should suffice. And who knows – there could well be a porky cash reward in it for you...

H F-W

■ Spaced out?

I have been reading the debate in your letters pages concerning the future of Virtual Reality and its social implications.

We have to look no further that the brilliant TV series *Red Dwarf*, or the accompanying book by Grant Naylor to get an insight into what could lay ahead.

There was a (computer?) game called *Better Than Life* which directly stimulated the nerve centres of the player (Game Head) whist the player's body lay slumped and dying in some corner. The game protected itself in such a way that the player wouldn't even remember starting to play, and was virtually impossible to stop.

Of course, this all just crazy Science Fiction set three million years in the future...

Glyn Pollington, Wollacombe, Devon

Crazy Science Fiction? Just you try working for *Express* – sounds remarkably like *Better Than Life* to me.

H F-W

■ Budget reality

A few weeks ago I read in *Express* about Virtuality, the Virtual Reality system. Well, I had to laugh – you see, I have been enjoying Virtual Reality for several years now – and whereas Virtuality costs 20 grand, my system costs a paltry 50 quid.

Because of my extremely generous nature, I am prepared to tell all to your readers and put these over-priced merchants in their proper place. To build the undisputed Virtual Reality system in the world, simply pop down to your local Dixons and purchase a Casio FX-730P pocket computer. On your way home, nip to the newsagents and buy some Sellotape. Then, when you get home, simply place the computer screen in front of your eyes and Sellotape it to your head (I thought this might be coming – H F-W).

Now you are ready to enter the world

of Virtual Reality. When I first saw this 'jdkendkenhkshnenbtd' displayed, I was convinced that I had fallen into a bowl of Alphabetti Spaghetti and was drowning. Fortunately, all that had happened was that the Sellotape had come loose and stuck across my mouth....

If you are really rich, you could buy some double-sided sticky tape as well, and hey presto, you immediately have a fully-expandable Virtual Reality system – just stick those extra speakers and accelerator boards on as you need them. Magic!

If you have a really big head, it is possible to have quadraphonic sound, 24-bit graphics and the computing power of an N-Cube stuck to your bonce!

The slight drawback is that you have to write your own programs, but where's the fun in buying pre-written ones?

Russ Flaherty, Liverpool

Er, yes Russ. Sure you don't have daily trouble coping with ordinary reality?

H F-W

■ Misled – or misguided?

I have just read *Express* 116 and note that your columnist Robin Alway mentions the SAM Coupé User Group and gives an address in Berkshire. I would like to point out that INDUG is the largest SAM Coupé users' group – we are founder members of Team SAM and have supported the machine since its inception nearly three years ago. As members of Team SAM we work very closely with SAM Computers Ltd, although we are, of course, totally independent.

Only SAM Computers Ltd can sanction the use of the name SAM or SAM Coupé, and, as far as we are aware, no person or organisation has been given permission to call themselves the SAM Coupé User Group.

As I know you have a lot of SAM readers and would hate to see them misled by Robin's column, could you please clarify the situation?

R P Brenchley, Format Publications, 34 Bourton Road, Gloucester, GL4 0LE

Claiming that Robin has misled anyone by printing the address of a group calling themselves the SAM Coupé User Group is a bit rich, Mr Brenchley. And it would strike me as being a bit rich if SAM Computers Ltd started getting nasty about the use of the names SAM or Coupé in association with a user group – surely the machine can use all the support it can get?

But being the fair-minded fellow that I am, I took the trouble to print your address in full – but would point out that INDUG is a user group for Spectrum and SAM owners rather than a SAM-specific organisation.

H F-W

■ Many happy returns...

What a major Kurfuffle about Old Codgers! (Careful – I could get in trouble if you use language like that – H F-W.) I have been in computing since I was aged 69 and I don't see anything strange about it at all. I currently possess an Atari 520STFM, double drive, colour monitor and printer and my main interests are 3D, graphics and video digitising. And I hope to continue for a long time yet.

I shall be 74 on Monday 28th January, so by the time you receive this letter you can wish me 'Happy Birthday'.

R J Wilkinson, Darlington, Durham

Consider it done, RJ, and I've raided our stock cupboard for a piece of ST software by way of a birthday present. But are you our oldest reader? More claims coming up...

■ ...On your birthday

When I retired some time ago, my sole experience of computing was with the old ZX81 – this taught me some of the principles of BASIC. I then decided to 'upgrade' to a Spectrum Plus 3 which I kept for a couple of years, and I still think its a great little machine, for all its limitations. I am now the owner of a 520STFM, and have been making some progress with GFA BASIC in which I can now make some reasonable programs.

When I can acquire a reasonably-priced manual for 68000 assembly language, I intend to have a go at learning Assembler. All I can say to your older readers is 'carry on computing'; It should give you a great deal of fun.

Perhaps I should mention that my birthday is on 1st February, and I will be 72 this year.

A Vest, Chester-le-Street

Happy Birthday to you too, Mr V – a mystery prezzie is also on its way to you. There's one more contender for the 'oldest reader' accolade...

■ Unlucky with elecky

My first computer was a ZX81 bought by mail order something over ten years ago. Alas, it was electrocuted when I got a new TV which turned out to have a live aerial socket.

My present machine Is a CPC6128. It died just before Christmas, and I assumed it, too, had been electrocuted as my refrigerator and four lamp bulbs failed at the same time. But the Electricity Board assured me that there had been no voltage surges.

My favourite dealers (The Computer Shop of Poole) came rapidly to the rescue and supplied me with a replacement monitor in part exchange.

By the way – I am 73 (and a bit).

John South, Creekmoor, Poole

Well there we have it. 73-and-a-bit doesn't beat Mr Wilkinson who leapt into his 74th year last week. Are there any 75-year-old readers computing away out there?

H F-W

MAIL SHORTS

■ Missed out

As I was reading *Express* 115 I noticed the front cover (Well done! – H F-W). 'So that was Christmas... but now the dust has settled *Express* can reveal' it said.

I ripped open the magazine, dying to know how the SAM Coupé got on through Christmas. I searched, and I searched, and I searched...

I noticed that you had mentioned every computer under the sun – except for the SAM Coupé!

Paul Strang, Lancashire

Well, the man who wrote the piece tells me that the SAM was left out because it is not a mainstream home computer. Yes, I know, all you SAM owners will moan and groan – but it's not in the major High Street multiples, and the feature was looking at their sales.

H F-W

■ Beard bother

Simon Butcher forgot to mention Alan Sugar in his list of computer people with beards and glasses. OK, so his beard isn't quite ZZ Top style, and he doesn't appear to wear glasses – but he may wear reading spectacles.

Maybe Mr Sugar would care to write in and tell us whether he wears an visual aids?

Daniel Walker, Reigate, Surrey

Then again, maybe he wouldn't. I wouldn't put money on a letter from Mr Sugar – but I could be surprised. Over to you Alan...

H F-W

■ Half shell, half-baked

Out of curiosity, would a pirated version of the Turtles game be Mock Turtle?

Ron Bullock, Deepcar, Sheffield

Probably not. But would a World Student games featuring three students be a complete cock-up? (Tenuous Sheffield-related joke there, readers.)

H F-W

■ Fiscal Wizard

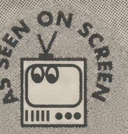
I have just looked in my Empire Stores catalogue and found that I can buy games cartridge for Sega, Atari and Nintendo consoles for as little as 80 pence a week. If I could buy Amiga software this way, I'd buy a damn sight more than I do at the moment.

D Preston, Tunstall, Staffordshire

Have you ever worked out how much you pay in total via your catalogue?

H F-W

■ TV Graphics



Just to add to this 'I've seen the Amiga on TV' thingy, is it true that they use the Amiga on ITV's *Catchphrase* to do the animations? The graphics look like they've been done on *Deluxe Paint III*. Can anyone confirm this?

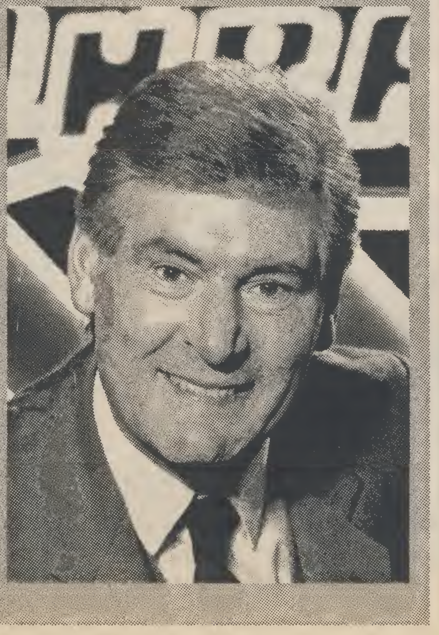
Steven Lord, Hebden Bridge

Yup, you're right. According to Chris Allen of a TV graphics company called Fingers, the A500 and A1000 were in fact used for the graphics in the current series – eight computers in all were harnessed to the task, with the A500s being slaved to the A1000s and Syquest drives used to store the graphics data.

The Amiga usurped some American Mindset PCs which were used in the earlier series – Amiga genlock boards made life much easier for the production team, but regular Amiga crashes made life more complicated.

We might bring you the full story in due course, dear readers... meanwhile, here's a fiver for your trouble Steve.

H F-W



• Up for the century: Catchphrase host Roy Walker will be fronting the 100th episode of the show on 10th February – aided and abetted by Amiga graphics.

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Macintosh

RECCOMENDED PD
Quite a lot of the software which I've mentioned over the last few weeks has been shareware, so it's probably a good idea if we give some details of where you can get hold of the stuff.

Incidentally, to avoid upsetting anyone, I ought to say that it becomes cumbersome to refer all the time to 'public domain and shareware software', and that therefore sometimes in this piece I'll use the term 'PD' to refer to both public domain and shareware programs. Yes, I know that there's a difference. But I'm too lazy to type the whole thing in every time. So there.

The largest supplier of PD and shareware for the Macintosh in the UK is something called Translatum International. It is the sole UK and European distributor of the software in the *Educorp* collection which, in turn, is one of the largest collections in the USA – from where about 95 per cent of shareware comes.

Its fees for disks are reasonable: £7 for one disk, £6 per disk if you order two or more plus postage and VAT. Now, this is where it gets complicated: Translatum also has its own software library, in addition to the *Educorp* collection. For a £15 membership fee, you get access to the Translatum library, a catalogue on disk, two free disks – one full of fonts, one of Desk Accessories (DAs) – and a £2 voucher. Your membership lasts until you have received twelve issues of the Translatum newsletter, which could be two or three years, as it's fairly erratic.

Are you following this so far? Keep going...

If you're a member of the Translatum club, disk prices drop to £6 for one disk and £5 per disk when ordering more than one (again, plus postage and VAT).

Assuming your brain has been able to cope with the details so far, the best thing to do is order the *Educorp* catalogue, a 300-plus page book detailing all the programs available. To do this just send a cheque for £2.50 to: Translatum International Software Club, Saithaelwyd Ucha, Carmel, Holywell, Clwyd CH8 8NU. If you don't feel up to writing that lot on an envelope, its phone number is 0352 710276, or if you're rich enough you can fax Translatum is on 0352 714769.

The catalogue is certainly worth buying, and if you're likely to be ordering much software, membership of the club makes sense. Disks are dispatched promptly, and since the club phone number is the owner's home number, there is service even after normal office hours (although I would suggest you don'ttry it after about 7pm...).

Next up is the Macintosh User Group UK. I've mentioned these boys before; the user group magazine is good, the telephone helpline is excellent and any Macintosh user should think seriously about joining.

Individual subs are £30 per year, and membership entitles you to access to the software library, from which disks cost £6 each. All members receive a catalogue, and updates are printed in the mag. You could, if you wanted, take out a 'PD subscription' for £55, which entitles you to a disk every month containing the latest PD and shareware releases, although it's a bit expensive unless you're fairly sure that you'll use most of what is sent to you.

POSTCARD FROM AMERICA

California has been enduring the worst drought of the century, but like ants running to a picnic, the rain is predicted to fall on the revelers' heads. Complaints will not be allowed, since we're all supposed to be praying for non-perspiration airborne water.

The frustrated sweat of Mac salespersons around the supply of new Macs was evident in *The Top Ten Things to Say When Your Customer Wants to Buy a Macintosh Classic*, faxed to the Berkeley Macintosh Users Group. Some of the gems included:

"Huh? You'll have to speak louder!"

"Say! Did you know the female gibbon gestates for 236 days?"

"A wise choice, but listen – I've got a great deal on a couple of uses Mac Pluses..."

"Let's see now. It appears that we're all out now, and there's a waiting list of 3,572 names. Funny, we had plenty of them in this morning."

Stress can do that to marketing types. Some people think Apple is in the driver's seat, especially with the recession. When a customer walks through the door, cash in hand, nobody wants to tell them to wait a month or two. That money may be feeding the cat by that time.

THE INTERFACE DEBATE

Think that the debate on computer user interfaces is over? Think again.

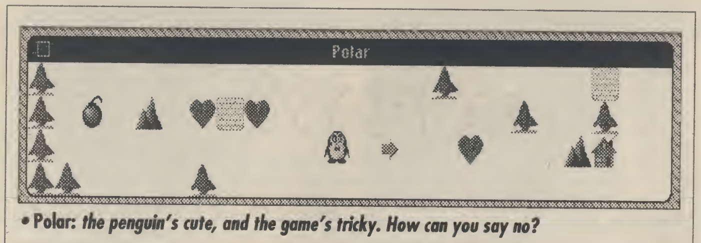
The way we interact with our technology is more than a matter of personal preference – it's an international political battle.

The dangers of standing too close to the microwave oven was evidenced by Randall Fields, chairman of Mrs Fields Inc. Mrs Fields is the cookie stand found in every US shopping mall. Randall gave the keynote address at the last Portable Computing Expo. He flamed the Macintosh, and all graphic user interfaces (GUI) for computers.

"The Macintosh must have been designed by the Soviet Union to limit American productivity," was one of his no-brainers. He said he couldn't "understand why Bill Gates would want to take our economy down the tubes by introducing Windows." He foamed at the mouth in his opposition to icons. I've often wondered if these rabid anti-GUIs have ever really used a Macintosh, other than a brief look-see in a computer shop.

A computer is a sorry substitute for human intelligence, but so are a lot of executives.

David Morgenstern



• *Polar: the penguin's cute, and the game's tricky. How can you say no?*

The Mac User Group UK also runs a bulletin board, and membership of the group gives you access to the PD and shareware available on the board. For a membership application form, call The Mac User Group UK on 0865 58027.

Another company which has a Macintosh PD and shareware section is Kingsway Computer Services. Its catalogue is only 24 pages long, and doesn't have a vast range of software, but on the other hand the disks only cost £4.99 each, including VAT and postage. And if you order ten disks at the same time, you get one free. Certainly, if the Kingsway collection has the stuff that you want, it's the cheapest option. Kingsway Computer Services is on 0742 750623.

Finally, a company called Shareware Marketing is apparently producing a Macintosh catalogue of PD and shareware disks. I know nothing else about it, except that it's free, and that the company claims to be "the largest disk vendor in the world by revenue". Its number is 0297 24088 – remember to specify that you want a Macintosh catalogue, as otherwise you're likely to end up with a PC one.

DA DELIGHT

If you're bored with action games, try getting hold of a rather neat DA called *Polar*. Apparently it's a simple version of *Pengo*, although since I've never played *Pengo* I can't comment on that.

Essentially, you guide your penguin around, pushing about bombs, ice cubes and hearts in a frictionless environment, attempting to get the hearts into a house. It sounds easy, but I can assure you that it ain't.

I found it on CIX, in mac/files, although it may well be available elsewhere. It's certainly worth a download if you want a little light mental relaxation in beween spreadsheets or whatever.

Ian Wrigley

PC

SCHOOL CAN BE FUN!

Some long-awaited news this week from Database Software, up North. The company is just putting the finishing touches to *Fun School 3*, and the three packages that make up the three age groups look to be absolute corkers.

Fun School 2 broke all records in its time, proving the only educational package to storm the charts. *Fun School 3* is even better. I've just got my sweaty hands on the Under-5s pack, and I'll be putting it through its paces very soon.

WHERE ARE THE CARTRIDGES?

If Amstrad's sales of the GX4000 console and Plus machines were disappointing over Christmas, it might have something to do with software availability – or lack of it!

I've actually been phoning around a few dealers to find out what games are currently available. What I've discovered is that just because no fewer than twelve console games are featured on the special in-store demonstrators, it doesn't mean that you can actually buy them all.

The most clued-up dealer I managed to speak to had only six titles in stock. These were: *Batman – The Movie, Operation Thunderbolt, Barbarian II, Robocop 2, Crazy Cars II* and *Fire & Forget II*. I know that Gremlin's *Switchblade* is now reaching dealers, but that still only brings the total up to seven. What is going on?

Well, Amstrad did circulate a letter claiming that there would be twelve titles available on cartridge as long ago as last December, but there was the somewhat predictable rider that the information was based on information supplied by the publishers.

And they are now as much in the dark as I am. Amstrad's cartridge duplicating is not yet, it seems, running as quickly as it's supposed to – to say the least. And many publishers are putting their console games on hold while they work out what the new machines are going to do. Certainly, if the punters don't see the software on sale, they're going to think twice about buying the machine. All this is leading to something of a catch-22 situation, I suspect. Watch this space…

ROBO IS BACK!

But there is happier news too. I've just got hold of a review copy of *Robocop 2* from Ocean. First impressions are of a tough game with some slightly iffy animation as old Robo leaps about. Those are only the first impressions, though – the game, once you get into it, is a lot, lot better than that. For a final verdict you'll have to wait until I've got stuck in a bit further.

FRESH FANZINE

"More wit than Kylie Minogue!" says a coverline, "More type-ins than we know what to do with!" screams another, "More features than a thing with lots of features!" wails a third. What is all this?

It's the cover of a new fanzine, in fact, by the name of *AOK*. The authors are Simon Tarplin, Matthew Harrodine and Paul Escott, although a box in the magazine explains that they are on the lookout for contributors.

AOK issue one has a review of the new Amstrads, a flight simulator round-up, a competition to win a camera, a

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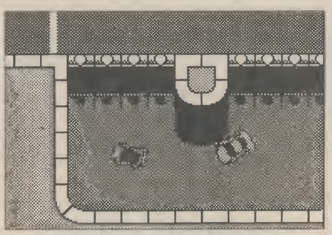
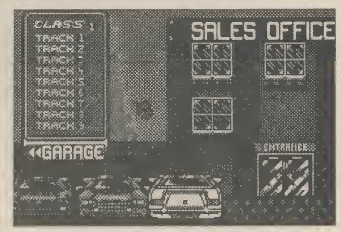


• *Supercars: Tough racing at the hairpin. It's the first lap, and already you're second...*



• *What do you do – race, go to the garage or browse around the showroom?*

couple of game reviews and some type-ins. Just a couple of words of advice lads. DTP programs on the CPC can offer loadsatypefaces, but there probably only about two or three that are actually readable at body text size, and they're the ones that printers do as standard. Also try to have every page using the same headline and body copy style – it gives the mag a much more unified look.

Other than that, the mag is bristling with enthusiasm and originality. If anyone is interested in becoming either a subscriber or a contributor, write to *AOK* at: 31 Colebrook Road, Shirley, Solihull, West Midlands B90 2LB.

SUPERCARS

Gremlin Graphics has got a real head of steam up at the moment. First there was *Shadow of the Beast*, then *Switchblade* on the console, then the brilliant *Lotus Esprit Turbo Challenge* – and now there's *Supercars*.

It's another driving game sure enough, but a long way from *Lotus Challenge* in style. It's a viewed-from-above effort reminiscent of the classic *Super Sprint*, but instead of the whole track being visible at once, you only see a section at a time, the screen scrolling as you move around the circuit. This does mean bigger, better graphics, but you don't get a simultaneous two-player mode (it would have to be a split-screen display if you did).

You start off pretty easily, racing against three computer cars on a none too difficult track. You'd have to be pretty crap not to win, basically, and when you do you pick up a nice, fat, juicy cheque for £20,000. The significance of this becomes apparent between races, when you get the chance to visit either the garage or a new car showroom. In the garage you can buy goodies like a turbocharger, side armour (you'll find out why), missiles and more. You can also repair your bodywork, refuel, get some fresh rubber and fix your engine.

You're going to need all that because although the races start off easy enough, the more you compete in, the tougher they get. Not only do the computer cars get faster and more determined, the tracks start to develop puddles of oil, water and something which behaves suspiciously like glue...

Ultimately, the bog-standard motor you start off with is not going to have what it takes to compete in the later races, even with all the goodies you can bolt on in the garage. It's just as well, then, that you can trot off to the showroom when you've got enough cash and buy yourself a bigger, better, faster motor. There are half a dozen waiting in the showroom, but you're going to have to win quite a few races for each upgrade.

The graphics in *Supercars* are simple, but neat and very effective. The scrolling is pretty smooth, too. Sound consists of a soundtrack that plays all through the race, only drowned out by terminal tyre squeal as you pile into yet another corner at twice the speed you should, plus the ominous thumps as your already knackered bodywork smacks the walls again.

Supercars plays very well indeed. The control method is simple, and the cars behave convincingly on the track, sliding gracefully as you overcook the corners. One nice touch is that you can prompt massive oversteer if you let go of the Fire button (Fire is accelerate) half way through a corner.

There are nine tracks on which to race, and although the first few will seem easy, things get a lot tougher very soon after that. Once you've completed your season, you then move onto 'Class 2' racing which is tougher again. After that there's Class 3 and I haven't got more than two races into that one, despite many hours of practice. The subsequent classes can be accessed with passwords, so there's no need to return to the earlier levels once you've completed them.

Supercars won't win any prizes for originality or accuracy, but it is a very polished and playable version of a favourite old game style. It is also tough enough to keep you going for ages.If only there had been a two-player mode, though – those human versus computer races do get a bit dull eventually...

Rod Lawton

Amiga

HARD HITTING KEYBOARD

I always thought synthesisers were the only kind of keyboards that were velocity sensitive, but Smartek in the States has proved me wrong.

It has just launched what it claims is the world's first velocity sensitive keyboard. We're not just talking first for the Amiga here, mind you. No siree, Smartek's product is an absolute first on any computer. It's available for a number of machines including the Amiga, Mac, PC, ST and even the Sega Genesis (that's a Megadrive, to us UK computer users).

The keyboard comes complete with two utilities – one useful, one perhaps not so useful. The first is a patch program for the AmigaDOS keyboard driver which will allow the Amiga to automatically interpret how heavily keys are struck. As an example application, Smartek claim that it can be set up for word processors so that when a key is pressed hard, the text style is changed. When you hit the key a bit lighter, the text changes back. The second application is apparently designed to help teach typetyping. Basically, the machine will tell you when you are hitting the keys too hard by going, “ouch”.

1500 GOOD REASONS TO BUY

Commodore's latest baby has finally arrived and, thanks to a sympapethic bank manager and Andrew Ball at Commodore, I've finally got my hands on one. It should retail for around a grand and here's what it has to offer.

The machine – Anyone who has ever owned an Amiga 2000 will instantly recognise the 1500. Apart from the rather tacky black and white badge on the front of the machine, the 1500 is basically a revision 6.2 B2000. If you don't believe me, just open up the machine and read the model number on the PCB!

OK, the 1500 isn't a new machine, but that isn't neccessarily a bad thing. For starters, the 1500 is based on the very latest release of the 2000, so you actually get a machine that is fully-compatible with all 2000 plug in cards and peripherals (including the Video Toaster, Flicker Fixers, Processor accelerators et all). Not only that, but you'll also be able to upgrade the machine to Workbench 2.0 and the Enhanced Chip Set when they are made available to existing 2000 users.

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• The Amiga 1500, well worth the asking price.

The machine comes equiped with a single megabyte of RAM. Just like the latest release of the B2000, the 1500 includes the ECS Agnuschip, so that megabyte of RAM is completely accessible by the customchips.

Further RAM will be treated as fast RAM, but having 1Mb ofchip RAM still proves to be exceptionally useful if you're into DTPor Desktop Video (although A3000 users are spoilt with 2Mb ofchip RAM!).

Also bundled as standard is an extra 3.5inch floppy (which, surprisingly, Commodore do actually fit before shipping) and a high quality colour monitor. As if trying to keep up with Philips' new trendy looking monitor, Commodore have restyled the 1084S (yes, it is stereo!) once again.

Deluxe Paint 3 – Well, what more can I say about Electronic Arts' acclaimed paint and animation system other than the fact that there's simply nothing TO touch it. If Commodore decides to use *DPaint 3* within future bundling deals, I can see the Amiga paint package market dying a very quick death (that is, until *DPaint 4* is launched!).

For those of you who have been living on Mars for the past five years, *DPaint* is a powerful paint system that allows you to produce artwork using up to 64 colours simultaneously (using ExtraHalfBrite). Version 3 of *DPaint* now includes animation facilities, allowing you to breathe life into your artwork.

Platinum Works – If you need a decent word processor, a database or perhaps even a spreadsheet, then MicroSystems' acclaimed suite of productivity software will more than fit the bill. Noteworthy among the packages bundled is *Platinum Scribble*, an enhanced release of MicroSystems' well respected word processing system. *Scribble 2*. All the standard functions you'd expect from a topflight word processor are there, plus comprehensive spell checking and thesaurus facilities.

Also included are special versions of MicroSystems' other software including the *Analyze!* spreadsheet, *Organize!* database,*Online!* communications and a number of extra utilities (including asideways printing utility for *Analyze!*). *Platinum Works* certainly isn't either new of particular groundbreaking, but it should prove to be more than adequate for most people's requirements.

Populous – EA's award winning *Populous* gives you the chance to play God with the people of a small planet. When it was originally launched, the game received rave reviews from just about every games reviewer worth their salt. The idea of the game is to help your own people populate randomly generated islands by making the land fit for habitations. While this is taking place, your opponent (the Devil) is doing likewise. Obviously such cohabitation can't last, so both yourself and your opponent can wreak devine vengeance on your eachother's people by sending earthquakes and floods against them.

Their Finest Hour – Perhaps Commodore thought that a simulation of modern air warfare would provoke bad publicity, so it has plumped instead for US Gold's simulation of the battle of Britain. Combining strategy and 3D combat action, *Their Finest Hour* is a pretty good game that is sure to keep you enthralled for hours.

Battlechess – A true Amiga classic. Even if you hate chess, you'll love *Battlechess.* Some would say that gameplay has taken second place to graphics and sound, but *Battlechess* is one of the few chess games that will appeal to all. Absolutely brilliant.

Sim City – If you think you have the solution to urban decay, then Infogrames' *Sim City* could well be your cup of tea. In this game, you can play the role of both mayor and town planner in this dynamic real-time simulation of city life. Build houses, factories and airports, organise urban transport, hire police, fireman, bulldoze entire neighbourhoods,collect taxes; these are just a few of the tasks that will be your responsibility.

In a special mode, you can even cause tornadoes,floods and fires at your whim. Even better, you can save San Francisco from the great earthquake of 1906, or even Tokyo from Godzilla. Both *Sim City* and *Populous* include expansion disks to further enhance two very good games. In the case of *Sim City*, there's even an editor which allows you to edit cities to your precise requirements.

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DISPLAY ENHANCER LAUNCHED

Users jealous of the quality of the A3000's display will be pleased to learn that Commodore has finally made the A3000's Display Enhancer hardware available to both 1500 and 2000 users as a plug in card. What's more, this official flicker killer card beats all competitors in the price department at just £99. For applications such as DTP and CAD that require a high resolution display, the card promises to deliver a rock steady image when used in conjunction with a multi-sync monitor. Contact Commodore on 0628 770088.

A-MAX 2 UPDATE

Still waiting for the launch of A-Max 2 Plus, the plug-in card version of ReadySoft's acclaimed Macintosh emulator? If so, then the news isn't good. According to UK distributor, Entertainments International, ReadySoft still hasn't finished the card. Indeed, the American company seems to be keeping rather secretive about the whole affair.

When I recently phoned EI for some information on this product, I was surprised to learn that not even it had received any form of information. Not a single picture, press release or even a bit of text describing specification-type details. Despite this lack of information, EI maintains that the card should be available in March. Personally, I'll only believe it when I see it!

Jason Holborn

Archimedes

SYSTEM ANTICS

Applications often come with a system folder on the disk. This should contain the relocatable modules needed for the application to run; the shared C library, floating point emulator and ColourTrans module are pretty well universal now.

From time to time, there are new versions of these and other modules, and it's a nightmare trying to keep all your floppy disk's system folders up-to-date. If you don't update them *all*, you risk a crash when an old module in memory is replaced by a new version as you start a new, more recent application.

The answer is simple: keep just one floppy (plus a backup) with a System folder, and put all your new modules in that. It may mean a couple of disk swaps when you fire up a new application, but that's less trouble than updating all your disks every time there's a C library upgrade.

How do you keep your system up-to-date? Check the dates of any new modules you receive (use the desktop and display Full Info in the filer windows), and the version numbers (load the module by double-clicking on it, then type f-12 and *Help Modules).

SysMerge is an Acorn utility for keeping your system folder up to date without all this messing about. It comes free if you get the new printer drivers from your dealer or from SID (Acorn's own bulletin board), but not if you get them by buying Clares' *Schema*. You run *SysMerge*, and drag your old system folder plus another system folder – which may contain newer versions of some modules – on to it. Only the new modules are transferred to your old System.

A quick techie tip: make sure that in the Boot and Run files within your System folder, Wimp$Scrap is set to <Obey$Dir>.ScrapFile and not System:ScrapFile. Some programs (*Schema* for example) can't transfer data to other applications if Wimp$Scrap is set incorrectly. Load the Boot and Run files into Edit to check.

A BETTER FILESERVER?

While the 'stars' of the recent BETT show were undoubtedly Longman Logotron's *Revelation* (discussed last week) and Digital Services' *Squirrel* (below), there were a number of other new products that caught my eye.

Third on my list was the latest Acorn Level 4 Econet fileserver software. This keeps files on an Archimedes, and distributes them around a network of Archimedes, Masters and model Bs. It runs as a RISCOS task, but is still a bit faster than the existing *FileStore* (a dedicated hardware fileserver). You can add almost any size of hard disk you want, and publish resources like Next Technology's CD-ROM around the network too.

Mostly it's better than *FileStore* because of the management tools – it makes network management a lot simpler. Harassed school network managers should check this out.

But beware, one of the major new features aimed at the classroom, the 'broadcast loader' that allows two or more machines on the net to load the same files at once, isn't quite ready yet and will only work with Archimedes, not old Beebs. Also, when asked about tape backup units, the Acorn person said, and I quote, "Err..." Full points to the man in the smart suit for pointing out I may need only a couple of gross of floppy disks to back up my fileserver.

For existing, mostly 8-bit networks, the SJ Research fileservers are probably still better. But Level 4 does make it simpler and cheaper to set up 'workgroup' nets of just a few Arcs, and is a great way to share a big hard disk and a PostScript printer between, say, five people.

GOING NUTS OVER DATABASES

Next please. I must be losing my grip. I didn't take any notice of the ads for the new *Squirrel* database from Digital Services. Yet if I'd only noticed the letters S, Q and L...

What drew me in was, in fact, a natty demo: two Arcs, one monitor, no people. One Arc was running *Squirrel* for real, the other was feeding it pre-recorded mouse movements to control it, as well as doing the spiel – the commentary to the whole demo routine had been sampled!

A more in-depth look at *Squirrel* showed it to be a rather groovy database manager. It's not 'relational' (for the techies, it's a flat file manager), but it is easy to use. Setting up a new database is a matter of drawing the fields into a window with the mouse. Fields can be plain text, numbers, dates, drawings, sprites or *Maestro* music files, and you can make it look pretty by setting colours, typefaces, size and so on for each field. You don't have to specify which fields will be 'key' fields (as for example with Minerva's *FlexiFile*) because all the fields are automatically indexed.

Searching for items in the database is simple; you just drag the fields you want to check onto a search card, type in the data you want to match, and click. You can match just one field (like search for all your Pickettywitch LPs), or combine criteria together with And and Or (search for all the films with both Doris Day and Cary Grant in them). *Squirrel* can present the Ands and Ors in a neat graphic that makes it easy to check you're going to get what you expect out of a search. This, I like a lot.

It works on a network, and is 'multi-user' with record-level locking so several people can be using the database at the same time, I'm told (I haven't had a chance to try this bit yet, but I expect a small parcel in the post any day now).

The eponymic SQL is a 'structured query language', very much flavour of the month in database circles, but too complex for normal people to use. It's strictly 'wireheads only'. Now *Squirrel* can translate your easy search commands into real SQL commands, which can be sent off to another database to do the actual searching. In principle, anyway. If this works as it should, then *Squirrel* could be an epoch-making product for complex networked databases. Even if it doesn't, it looks like a great database manager for the rest of us.

At a shaving under £150, it costs the same as its obvious rival *FlexiFile*, but seems to be much easier to use. You trade the semi-relational aspect of *FlexiFile* whereby you can link items in two separate databases, for a better, more graphical approach to searching and a more attractive on-screen presentation. You can do a lot of the standard database and pretty presentational stuff with a package like *Genesis II* too, but the multi-user bit and graphical view of search criteria in *Squirrel* are worth their weight in something or other.

RISCBASIC UPGRADE

If you use Silicon Vision's RISCBASIC compiler, upgrade now to the latest 2.06 version which has an improved compiler. It's RISCOS compliant, so you can compile files by dragging Basic program icons onto the compiler.

Silicon Vision is also offering a Desktop Development Environment (DDE) which allows you to compile files by dragging them onto the compiler icon on the desktop from *Edit*, *Twin* or the *BASIC Editor*, and passes files back to these applications with syntax errors already marked. If you've registered an earlier copy, the DDE upgrade is £50. New copies of RISCBASIC 2.06 include both the compiler and DDE for £150.

LET YOUR FINGERS DO THE WALKING

If you want any further details forced upon you, here are the numbers to call. Remember to say Ken sent you.

Digital Services: 0705 210600.
Minerva: 0392 437756.
SJ Research: 0223 461426.
Silicon Vision: 081 422 2274.
Acorn: 0223 245200
SID: 0223 243642 (use Prestel standards). You can get SID via Micronet too (*SID#).

Ken Coumarin

PC

NOT A LOT OF PEOPLE KNOW THAT

When the old 8086 chips (or indeed, any of the other Intel 80x86 chips) wake up in the morning the first thing they do is look for an instruction. Keen little horrors aren't they?

You might think that a good place to look for your first instruction would be at address zero, but not Intel. It decided that a much better place to look for one is at address FFFF0H, or just 16 bytes short of a megabyte – so that's where the 8086 and all similar chips do look.

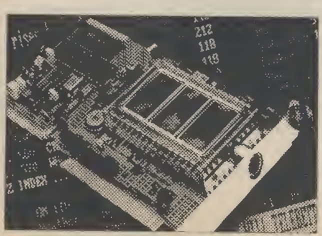
This is the reason why your PC's BIOS is right up there at the top of memory, hanging in space as it were. Clearly, since the chip is always going to look there that's a good place to put the instructions that start your PC doing something useful. It follows that forcing the chip to stop doing whatever it's currently doing and go there Right Now will reset the machine. Most reboot utilities do exactly that.

Of course, that's a cold boot, and it results in the PC going off and checking memory, looking for ports and all the other things that take time. Ctrl-Alt-Del by contrast, performs a warm boot. It assumes that your machine has already been checked once and it's OK, so it simply re-initialises the PC and puts you back at the prompt – a much faster process.

You can do a warm boot by jumping to a specific memory location but it's much better to use Interrupt 19H, provided for that very purpose.

SHARE AND SHARE ALIKE

One of the major sales points of Microtext's teletext adapter has always been the ability to quickly refer to information on Ceefax and Oracle. Unfortunataely the difficulty has been getting the computer to make use of that information directly. Microtext



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supplies the relevant device drivers with the adaptor so that programmers, even BASIC programmers, can get at the info, but that leaves the rest of us a bit out in the cold.

ST owners have long had applications software which supports the adapter directly for functions such as analysing a share portfolio, and now PC owners have some of the same facilities.

A free program has been written by Microtext which lets you download all the share prices you are interested in to a text file by typing a single command. This isn't anywhere near as sophisticated as the Atari program, but it's a start, and it's free. Also I'd much rather deal with importing a text file into a spreadsheet than writing code for device drivers.

To operate the software you write two lists, one of channels and teletext page numbers, the other of names of major companies. The program refers to the two lists and then checks Ceefax. The share prices are then output to a file, either labelled for direct reading or as a list of numbers for incorporating into a spreadsheet.

The program is available direct from Microtext on 0705 595694.

WORDSTAR FOR WINDOWS

Bowing to the inevitable, there is to be a version of *WordStar* for Windows. I must confesss I find this a strange idea, as the main thing which sets *WordStar* apart from its rivals was its user interface. I still find myself hitting Control-K X on my Mac! Of course under Windows *WordStar* will have exactly the same interface and command key sequence as every other Windows program.

The other oddity about the new *WordStar* is given away by its name: *WordStar Legacy*. Yes, that's *Legacy* as in the Windows word processor. It appears that WordStar has bought *Legacy* from NMI, and will be incorporating the source code into its product. Whether that means it will just be selling *Legacy* in a new box is not clear.

The PR company did send a nice little graph indicating where it thinks *WordStar Legacy* would fit in to the word processing market, but after staring at it for half an hour I was none the wiser.

WordStar Legacy will be available from March 1, with no price yet announced. More on 081- 6433 8866.

LASERJET SOLUTION

When you run a program under Windows, all the printing goes through the printer driver which is part of Windows. The LaserJet printer driver is not held in very high esteem; it's slow and a bit cranky in operation. Hence *SuperPrint*.

SuperPrint is a new improved whizzy LaserJet printer driver which offers PostScript-like features such as scalable printer fonts on the fly and alterable line screens for graphics. The product also claims that it prints text and graphics faster then the Microsoft driver. The examples which Zenographics sent me certainly are of a higher quality than the equivalent ones printed with the ordinary driver. And another major plus is that *SuperPrint* provides on-the-fly screen fonts as well, banishing the jaggies.

SuperPrint has a competitor in Adobe *Type Manager*, but the two programs operate in a totally different way; *SuperPrint* offers finer control, whereas *ATM* is much easier to use. Whichever you prefer *SuperPrint* is worth investigating if you have a LaserJet and run Windows.

For more details contact SuperPrint's UK distributor Bit UK on 0420 83811.

Stuart Anderton and Steve Patient

64

BOARD UPDATE

You're going to have to wait another week for details of how *Heroquest* is shaping up on the 64 (see *Express* 117) but the news just in is that US Gold is planning a special AD&D day to launch the next titles from SSI (which will include the sequel to the excellent *Champions of Krynn*). I'll bring you more details of the games when the dice rolling day comes.

At the other end of the entertainmen spectrum is *Creatures 2* (see *Express* 116). All I know about this so far is that the deranged torture screens that put the icing on the proverbial cake the first time around will feature more heavily in the sequel, though when I spoke to the people at Thalamus they said they didn't want to lose the balance of the original's gameplay. Good for them.

BACKTRACKING

This is the beginning of the quietest time for games releases. Christmas costs software houses almost as much as they make. They can't keep it up forever. Nor can we, for it works both ways.

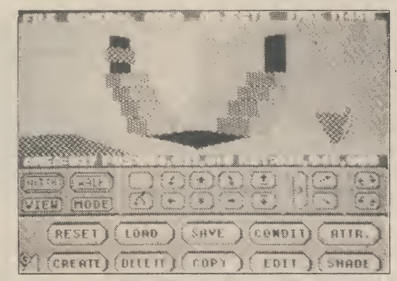
A few years ago, on another magazine, February was noted as being the month in which most reader submissions came in. The conclusion was that people were spending more time with the games they had and less time devouring new ones. And this kind of consolidation isn't restricted to games players. *Commodore Format*'s technical editor is almost snowed under with readers' programs at the moment.

It's the ideal time to launch the kind of programs so inaccurately described as productivity software. Incentive is just about to do this with the *3D Construction Kit* (*Express* passim). It sounds like the kind of program that would have been lapped up by both PD fans and entrepreneurs alike five years ago. In fact, five years ago, Incentive brought out a similar productivity tool called *GAC* (*Graphic Adventure Creator*) on the 64 which did just that. People used it successfully as a high level adventure-writing language and some of the results that filtered through the PD chain were very promising. Even though nobody ever released a game that really used *GAC* to its full potential, it created at least one small company (now sadly no longer with us).

It would be good to see the same thing happening with *3DCK* if it can really handle large (adventuring size) scale models with built in triggers. Public domain demos might never contain a scrolling message again. Fat chance.

Despite the potential of the kit to kick people's imaginations up the backside there seems to be less motivation among 64 users now than back in 1985/6, even though there are at least as many active users of the machine now as there were then. Part of the reason why a flood of exciting kit-based demos isn't on the agenda is that five years ago innovative programmers were finding out for the first time what a lot of the current crop of programmers take for granted – how to get a glitch-free scroll or how to get sprites into the border. The 64 doesn't have the frontier quality it used to have.

But part of the reason is also the feeling that 64 users are less active than they used to be. We have a wider games software base now than when *GAC* was actually seen as a major commercial threat to a similar productivity tool that was already established at the time (ie *The Quill*). It's funny. Almost every enthusiast you talk to now, regardless of the machine they own, will happily wax lyrical about the potential of virtual reality. And yet with what might be the first affordable form of it (albeit a microcosmic version) just around the corner, the chances of it making a major impact in the way people use their 64s is slim. Oh, well. Might as well look forward to autumn then. That's when the next clutch of carnage clones are due.



• 3-D Construction Kit: will it's worth ever be fully realised?

FINAL FACTS

Those of you who would like to stun the tired world of 64 users with your undoubted talents but who haven't yet mastered the art of programming might be interested to know that world famous Phil South is currently running a BASIC tutorial in *Commodore Format*. In conjunction with this august journal's own series on the same it could take you quite far.

And finally, I've seen *St Dragon* (by Storm) and there are plenty of nice things I could say about it instead of moaning that its main problem is that it's too easy to finish. Ah, my life.

Sean Masterson

Spectrum

EXPAND YOUR SAM

The new year seems to be starting pretty well for the SAM Coupé. SAM Computers Ltd has three shiny new products for its machine which can only be considered A Very Good Thing Indeed.

Firstly there's MasterDOS. This is an extension to Coupé DOS for advanced users and programmers. For the £14.95 asking price MasterDOS allows root directories to be created (as in MSDOS) so you can store, for example, FLASH! screens separately from games. Rather impressively, you can also set up a RAM disk with the utility so that fast loading and copying is possible. Meanwhile advanced programmer types will go a bundle on the way MasterDOS permits random access and serial files.

The program has been written by SAM BASIC author Andy Wright and SAMCO claims it will "be an invaluable tool for anyone who takes their SAM Coupé seriously."

Next there's some ware of a decidedly harder variety with SAMCO's 1Mb memory pack. This should satisfy Coupé owners lusting for more power with the interface providing an extra 1Mb of external memory. Unfortunately it can't be used in conjunction with BASIC but expect software writers to make use of all that rippling extra memory soon.

If you really want a big memory you can whack four of the packs together and own a SAM Coupé with a throbbing, pulsating and potentially world dominating 4.5Mb. Power mad types can buy a memory interface for £79.95.

The increasing amount of hardware for the SAM means congestion problems around the Coupé's single expansion interface. Hence the release of the SAMBUS, a nifty piece of kit allowing a further four interfaces to be connected up to our blue footed chum. SAMCO has also thrown in a real time clock and because some interfaces demand extra power you can also connect an optional power supply unit to the SAMBUS enabling it to handle any add on you care to throw at your Coupé, from printer to Peruvian Rug Weaving Robot. The price is five pence short of £50 with the optional power supply costing £19.95.

As well as all the above nifty sounding stuff the Coupé should be getting its first spread sheet fairly soon. GM Software of 48 Main Road, Cryant, Neath SA10 8NP is currently slaving over a hot SAM working on GM-Calc. It's quite a way from completion at the moment but the finished one should be menu controlled and configured to 26 columns by 15 rows with each cell comprising nine characters. I've already mentioned their £4.95 database

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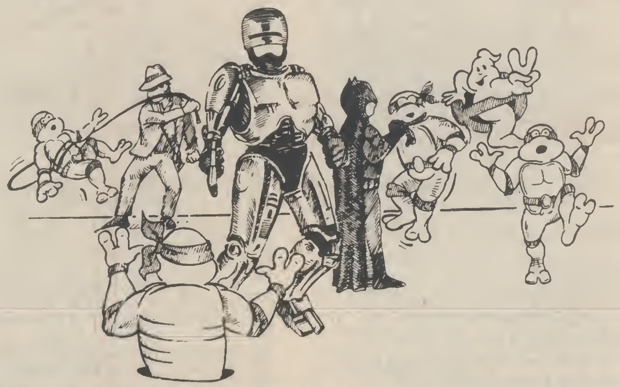

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program in a past column. More details in a future column.

ANNOY YOUR NEIGHBOURS

Robert Jacobs of London has written asking, nay demanding, to know more about the Cheetah SpecDrum. He wants to know simply "if its any good" and "how well does the Speccy recreate an authentic drum sound?"

Well, perhaps surprisingly, I can confirm it's very good indeed and tell you that to my ears at least the drum sound is easily good enough to annoy the neighbours. That's providing you' have suitably loud amplification, of course, as the SpecDrum needs to be connected up to a stereo or ghetto blaster so that you and your immediate family to enjoy the variety of loud thumpy thumpy noises it can produce.

It's been around quite a few years now which means you can often buy it for bargain prices. For example, Datel Electronics (Tel 0782 744707) is selling them for £14.99 complete with extra Latin and Afro drum kit software. What an absolute bargain!

RETURN OF THE POKE MONSTER

He's back! After an absence of at least a week or two it's good to see the triumphant return of our old pal and mucker, Miktor – aka Mark Harris of Faversham, Kent. As per usual his planet-sized brain has managed to come up with another load of pokes and cheats.

Here's an infinite credits poke routine for *Chase HQ II*. To get it working simply type it in, save to tape if you want, then type RUN and start your *Chase HQ II* tape from the beginning.

```
10 CHASE HQ II (CREDITS)
20 CLEAR 3E4 : FOR N=63615 TO
63664
30 READ A : POKE N,A : NEXT N
40 PRINT "START 'CHASE HQ II'
TAPE"; USR 63615
50 DATA 221,33,254,174,17
60 DATA 16,16,62,255,55
70 DATA 205,86,5,48,241
80 DATA 33,1,2,34,0
90 DATA 191,195,93,175,33
100 DATA 169,248,17,144,91
110 DATA 1,20,0,237,83
120 DATA 51,190,237,176,195
130 DATA 13,191,62,255,50
140 DATA 190,149,195,223,190
```

And there's more. Here's a correction to one of Mark's cheats I printed a month or so ago.

Midnight Resistance – Type I AM AN OCEAN GAMES TESTER. In game W + FIRE Weapons, B + BACKFIRE Backpack Also 128K only, redefine keys and type WE WANT TO HEAR MUSIC.

Another huge dollop of fawning thanks go to Mark!

Have you got any hints, cheats, pokes, routines or tips for the Speccy or SAM? They can help with games, utilities, programming or just plain using. Send everything relevant to: Robin Alway, The Spectrum Column, *New Computer Express*, 30 Monmouth Street, Bath BA1 2BW.

Robin Alway

ST

HANDS ON EXPERIENCE

There's little doubt that MIDI has revolutionised the face of modern music production. However there must be an army of musicians out there who remain baffled by the whole process. Hands On Midi software has recognised this and produced a very unique product in the process.

Hands On has transcribed some of the more popular songs of recent years into a MIDI format. What this means is that if you own Steinberg *Pro 24* sequencer, you can load up the MIDI file and see exactly how a song is constructed, drum patterns and all. Apparently some of the musicians whose music has been converted by Hands On, have purchased the song to see how MIDI works for themselves. Two programs, namely *Gig* and *Masterclass* are available now.

Songs in the catalogue include *Ride On Time* by Black Box, *Bad* by someone called Michael Jackson and *Toccatta and Fugue* by Rap Meister Bach. The appeal of the software is limited to owners of Pro 24 so it would seem sensible for Hands On to convert the data to some other formats, like Notator or Cubase.

Contact Hands On at Midi Software Ltd, 14 Lodge Road, Bedhampton, Havant, Hants, PO9, 3LL, or telephone 0705 452628.

COMPUTER SHOPPER SHOW, PART 27

The latest in a seemingly endless line of computer shopper shows is in the pipeline. The box-shifting sections of the computer industry love these events because they can off-load zillions of dated games on the public for five quid a throw. But if you know what you're looking for then it is possible to pick up the odd bargain. The spring shopper show takes place from the 10 to 12 of May at Alexandra Palace, in London.

INGLISHE AZ SHEE IZ WRIT

Let's face it, you can't all write as well as us journalists (pause while sub-editor wets himself laughing). The major problem with most people's writing is bad grammar (innit) and up to now there's been little you can do about that. Enter an enterprising chap by the name of Phil Comeau, who lives in Canada.

Mr Comeau has written *Gramslam*, a grammar checker which works along very similar lines to a standard spell checker. The program searches out phrases and words which are wordy or repititive and compiles a report on them. This means that you can search through letters, memos, essays and the

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TRACKER CUT

Phil Harman of MPH has just revealed that *TCB Tracker*, that stonking piece of music software, has taken a major price cut to £24.99. The program, which previously retailed at over £40, enables you to play four part songs comprised of samples. These can then be played back without the program in a machine code or Basic program. MPH Software is on 0603 503382.

UK DOUBLE CLICK DISTRIBUTERS

The replacement desktop by Double Click software which I covered in last week's column is now available from a British distributer. Softville Computer Supplies is selling the natty software for £20.55 (inc. P&P). The company is also distributing *DC Utilities* for the same price. Write to Softville Computer Supplies, Unit 5, Stratfield Park, Elettra Avenue, Waterlooville, Hampshire, PO7 7XN or telephone 0705 266509.

COMPUSERVE ST

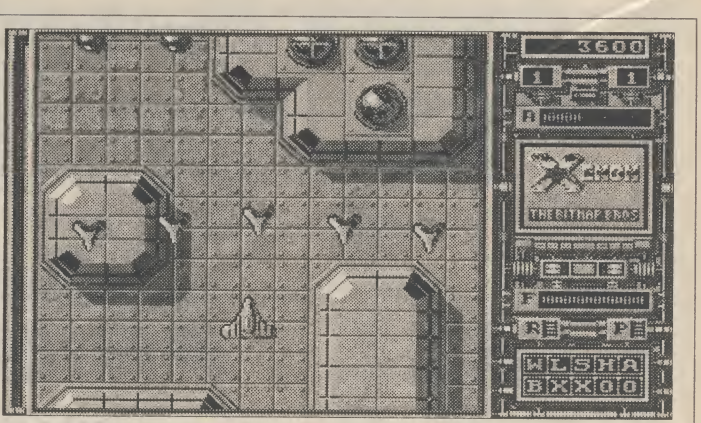
One of the more interesting aspects to arise out of the communications revolution, is the ability to communicate with foreign computers. Of particular interest are American databases, which boast massive subscriber support. The biggest of them all is CompuServe, which through a network spread across the states enables you to access vast amounts of data.

Of particular interest to people reading this column is the Atari section on Compuserve. Three main forums enable American ST owners, access to both hobbyists and professional companies alike. The Arts forum includes thousands of pictures in all popular formats as well as graphic utilities.

The *Z-Net* and *ST Report* on-line newsletters are also in this forum. In the productivity forum you'll discover masses of public domain software, covering everything from games to business. The third section is the Vendor's forum. Here, 20 of the largest American hardware and software companies have their own libraries, where updated software and news is uploaded for public consumption.

While these three forums are likely to be of most interest to ST owners, it would be stupid to just restrict CompuServe usage to these areas. Electronic Mail, shopping, on-line news, cooking, recipes and holiday guides are just a few of the other areas you could access.

CompuServe is reached through the Istel or Packet Switching Network in this country which means you only pay a local telephone call charge. You then pay the equivilant of $22 per on-line hour, along with a once only subscription fee of £19.95. For more info call CompuServe free on 0800 289458.



• **Xenon:** ***just one of a horde of old titles coming out at budget prices.***

PLAY LIKE A GOD

The Bitmap Brothers, those saviours of ST gaming, have come up with a brand new game. *Gods* is an eight way scrolling platform game which boasts aliens with an IQ. The Bitmaps decided that they could bring new light to the jaded platform format by combining strategy and puzzle elements with a hard shoot-'em-up flavour.

The mythologically-influenced aliens can perform party tricks, such as dodging your bullets and chasing you through mazes. However if they prove to be too tough for your tastes, the program will detect this and make life easier for you. *Gods* will be available from Renegade by mid to late February.

BUDGET BLASTING

Software houses, aware of the fact that everyone's skint after Christmas, have released a whoop of cheapy games. Mastertronic, have let loose *Silkworm*, *Gemini Wing*, *Xenon* and *Double Dragon* on their 16 Blitz Plus label, each retailing at £4.99. The Action Sixteen range of games offers better titles at twice the price including *Colorado*, *Hostages* and *Gridrunner*.

Software house Kixx has also released some old games on budget. However it has gone for a middle of the road price of £7.99. *Thunder Blade*, *World Class Leaderboard* and *Blateroids* are three of the games in their series.

Andy Hutchinson

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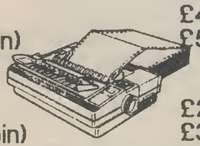

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Includes A1500 computer (1Mb RAM, 2 x 3½" Drives, 8 expansion slots), Commodore Hi-Resolution Colour Monitor, plus Software including: 'Deluxe Paint III', 'Battle Chess', 'Sim City' and 'The Works' (business software).

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Good quality Commodore Hard Disk unit, including its own PSU and built-in cooling fan. Features sockets for up to 2Mb of on-board FASTRAM expansion (see below). 80ms Access time, with up to 2.4Mb/sec. transfer rate. Autoboots when used with Kickstart 1.3.

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We are now supporting specially upgraded versions of the A590 incorporating NEC high capacity, fully autoparking SCSI drives (25ms access time). SCSI interfaced hard drives offer a substantial performance increase over conventional units.

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512K Upgrade ..... £ 31.95
1MB Upgrade ...... £ 59.95
2Mb Upgrade ...... £ 99.95

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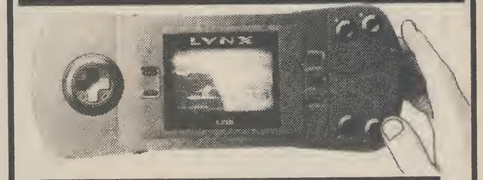

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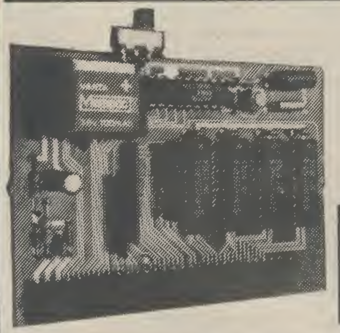

512K RAM/CLOCK UPGRADE

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512K RAM CLOCK EXPANSION FEATURES :

- ☆ Direct replacement for the A501 expansion
- ☆ Convenient On / Off Memory Switch
- ☆ Auto-recharging battery backed Real-Time Clock
- ☆ Compact Unit Size : Ultra-neat design
- ☆ Only 4 low power consumption FASTRAMs

512K RAM Expansion also available without clock for only £29.95

1.5MB RAM EXPANSION BOARD

- ☆ Fully populated board increases total RAM capacity in an Amiga 500 to 2MB !
- ☆ Plugs into trapdoor expansion (as with 512K unit) ; connects to GARY chip
- ☆ Includes Auto-recharging battery-backed Real-Time Clock
- ☆ Socketed FASTRAM ICs for accommodating up to 1.5MB RAM

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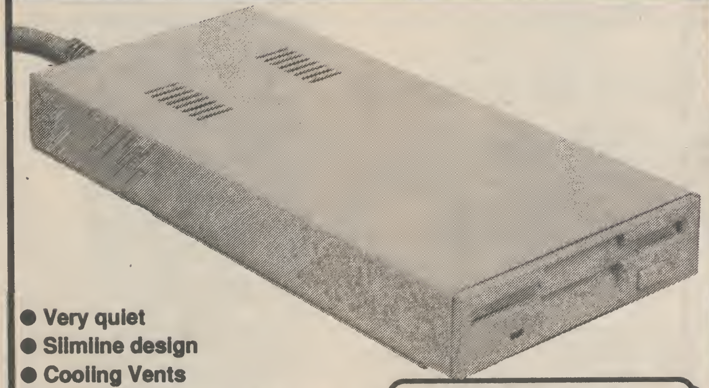
RAM Board as above, with 1MB FASTRAM installed ...... £ 74.95
RAM Board as above, with 1.5Mb FASTRAM installed .... £ 89.95

N.B. : The expansion board requires Kickstart 1.3 to operate - Kickstart 1.3 upgrade available from us for £29.95

Amiga & ST 3½" Drives



- ● Very quiet
- ● Slimline design
- ● Cooling Vents
- ● Sleek, high quality metal casing
- ● Quality Citizen Drive Mechanism
- ● On / Off switch on rear of drive
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- ● Full 1Mb Unformatted Capacity
- ● Long reach connection cable

ATARI ST VERSION : £59.95

AMIGA VERSION : £54.95

5¼" External 40 80 Track Drive also available for only £99.00

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All models include cable

Star LC 10 9-Pin, 4 fonts, 144 /36cps .... **£ 159.00**
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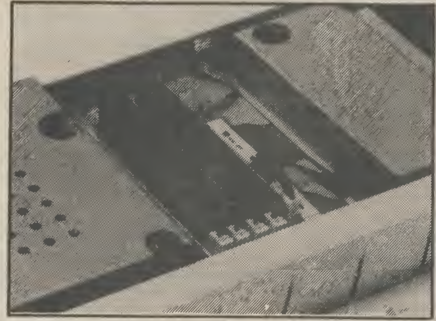
All STAR printers include 12 months On-Site Maintenance

Citizen ProDot 24 COLOUR Professional 24-pin colour printer, 200/66cps. Fully featured, 2 years warranty.
Normal RRP £ 746.35, Special Offer price ....**£ 269.00**

SOLDERLESS MEMORY UPGRADES FOR ST's



✓ Fits any STF, STFM or MEGA series machine in minutes!

✓ Uses SIMMS RAM Modules for Effortless Upgradeability

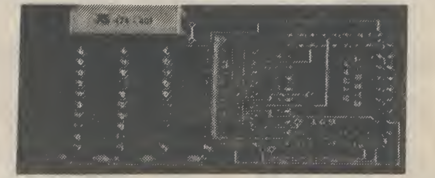
✓ Probably the neatest ST RAM Upgrade available!

RAM Upgrade with board unpopulated	£59.95
RAM Upgrade With 512K RAM Installed - upgrades a 520 to a total of 1Mb RAM	£89.95
RAM Upgrade With 2Mb RAM Installed - upgrades a 520 1040 Mega1 to 2 2.5Mb	£174.95
RAM Upgrade With 4Mb RAM Installed - upgrades a 520 1040 Mega ST to 4Mb	£284.95

N.B. Due to the large variance in design of the Atari ST, there is a small minority of boards in existence which may require a little soldering.

Upgrade the memory of your ST quickly and easily with our new, fully software compatible RAM upgrade board. Designed for pre-STE machines, the unit accepts SIMMS slot-in memory modules, making RAM fitting simplicity itself. No electronics knowledge needed! Available with or without RAM modules. Allows upgrade in stages of 1Mb, 2 / 2.5Mb and 4Mb, as and when necessary. Straightforward installation - full, comprehensive instructions provided.

PLUG-IN, SOLDERLESS RAM UPGRADE FOR ANY ATARI 520 ST



Now there is a simpler, faster and more effective method of upgrading your humble 520 ST to 1Mb RAM ! Our new plug-in 512K memory upgrade unit offers excellent value for money, requiring no soldering or special technical know-how. (Not suitable for STE machines.)

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ATARI

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All our ST prices include mouse, user guide, etc PLUS 5 disks of Public Domain software including paint program, wordprocessor, games, graphics & sound demos, desk accessories and utilities

KICK OFF WITH THIS DEAL FROM EVESHAM MICROS !

'Kick Off 2'
'Tracksuit Manager'
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520 STFM 'DISCOVERY PACK'

High quality, good value package based around the 520 STFM computer including 512K RAM, 1Mb Drive and built-in TV modulator. Also supplied is :

STOS Games Creator	Outrun
Carrier Command	Bomb Jack
Space Harrier	Neochrome
FirST BASIC	Atari ST Tour

plus 'Discovering your Atari ST' Book

£269.99 inc.VAT and delivery

ONLY £299.99 WITH 1MB RAM FITTED

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Includes an Atari 520 STE with 1Mb Drive, joystick, plus a high quality selection of software including :

Indiana Jones & Last Crusade	Blood Money
Impossible Mission 2	Super Cycle
Human Killing machine	Out Run
Dragons Breath	Anarchy
Hyper Paint 2 (STE version)	FirST BASIC
Music Maker 2 (STE version)	STOS

£359.99 inc.VAT and delivery

ONLY £389.99 WITH 1MB RAM FITTED
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Superb starter package, consisting of a 1040 STE with an excellent selection of starter software. The package includes :

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Kuma Spreadsheet	Hyper Paint
Kuma Database	'Prince' game
Kuma Business Graphics	STAC Advent. creator

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ONLY £609.99 WITH 4MB RAM FITTED

520STFM 1Mb Memory Upgrade Kit, requires soldering	£ 59.00
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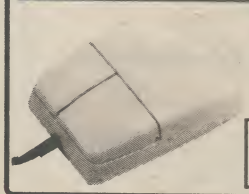
TRUEMOUSE (ST OR AMIGA)



WE GUARANTEE that this is the smoothest, most responsive and accurate replacement mouse you can buy for the ST or the Amiga. Excellent performance, amazing low price !

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(STATE MODEL WHEN ORDERING)

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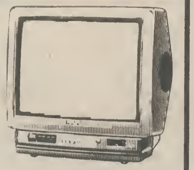

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inc. VAT, delivery & cable

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Advance Opus Hull	0482 28367	V21/22/22b/23
After Hours	0276 52096	V22/V22bis
Airtel	0342 717800	V21/22/22b
Aix-386	0905 52536	V21/22/22b/23
Ajl Electronics	0452 309125	V21/22/23/23v
Alan Solomon'S Bb	0494 724946	V21/22/22b/23
Alchemist	0666 504597	
Alternate Reality	0352 856626	V21/22/22b/23
Alternative Reality	0959 76695	V21/23/23v
Alternative V/data	081-761 8220	V21/23/23v
Almac PC Board	0324 665371	300--2400MNP5
	0324 665460	HST
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Arena	0625 539063	V21/22/22b/23
Argus Project	091-490 0327	V21/22/22b/23
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Attic	081-308 0466	V22/22b
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Banat Board	081-783 1151	V21/22/22b/23
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Barnabas	0708 852526	Hst
Barney'S Rubble	021-441 1801	V21/22/22b/23
Basingstoke Opus	0256 728331	V21/22/22b/23
Bath BBS	0225 83584	1/840060
Bath BBS	0225 840060.	V21/V22/V23/V22bis
Bay BB	0227 741528	V22 Bis/MNP5
Bbs09	0705 736025	Hst
Bbz	081-663 3732	V21/22/22b/23
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Bradford Bb	0274 480452	V21/23/23v
Braindead Opus	0823 254352	V21/22/22b/23
Breakthrough	051-734 5817	V21/22/22b/23
Brown Bag	071-404 0897	V21/22/22b
Brunel Bbs	0272 584352	V21/22/23
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Catweazle	081-428 9476	V21/22/22b
CCl4	0482 655798	V23/23v
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Chequers	0622 891308	V21/23
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Chipboard	0532 320225	V21/23/23v
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Cix	081-399 5252	V21/22/22b/23
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Co-op B'Mouth	0202 532701	V22/22b
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Critical Mass Bbs	0727 56939	V23/23v
Crown Green	071-245 1512	V21/22/22b/23
Crystal Tower	081-886 2813	V21/22/22b/23
Cure	0604 27865	Hst
Cv Database Bb	0427 810211	V22/22b
Cyberspace Amiga	0295 275045.	V21/V22/V22bis
Cymrutel	0492 49194	
Cynotel	081-346 2816	V23v
D.i.e.	061-434 9907	V21/22/22b/23
Dambusters	0203 333195	V21
Dark Crystal	081-207 2989	Hst
Dark Halo	0392 434477	Hst
Dark Side	0446 33729	V21
Darkhaven	0604 413716	V21/22/22b/23
Data Network	081-478 5464	V21/22/22b/23
Datnet	0245 323693	HST/V32/V22bis/V22/V21
Datasel/wanderland	081-680 5330	V23
Datasoft Opus Bbs	0460 54615	V21/22/22b/23
Datatrade Qbbs	0536 725180	Hst
Dbase User Group	0532 842213	V21/22/22b
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Dcs	081-879 7578	V21/22/22b
Deep Thought	0634 683696	Hst/v32
Desert	0244 550332	V21/22/22b/23
Desert BBS	0604 758126	V21/22/22bis
Diamond Opus	0791 86504	Hst/v32
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Domain Bbs	081-773 2422	V22/22b
Dragon'S Tower	081-202 0709	V21/22/22b
Dunedin Blackhole	031-669 2974	
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Exchange S/w	0767 5051	V21/22/22b/23
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Gaslamp	0706 358331	V21/22/22b/23
Gaugonzola Bbs	0453 511112	V21/22/22b
Gnome At Home	081-888 8894	V23v
Gods	081-994 9119	V21/23
Golly!	0734 320812	V21/22/22b/23
Goobtel	0602 706307	V21/23
Good Life	081-541 0187	Hst
Gopherit'S Box	061-320-3208	V21/22/23
Gourmet	0474 536654	V21/22/22b
Grainstore	0905 770198	V21/22/22b
Grenadier	0825 762803	V21/22/22b
Hacker'S Delight	0702 523853	V21/22/23
Halfwits Bbs	0272 340310	V22/22b
Hamnet	0482 465150	V21
Harlequin	061-945 3612	V21/22/22b/23
Hastings Bbs	0424 717919	V21/22/22b/23
Hawk'S Castle	0344 411621	Hst
Hazzard Bb	071-737 0505	V21/22/22b/23
Health-data	081-986 4360	V23v
Heartbeat	0734 352032	
Hilary's Board	0277 233468	V21/23
Hot-air Opus	0579 70347	V21/22/22b
Humber Bridge	0482 850785	V21/22/23
Ichthus (trinity 3)	0734 461466	V21/22/22b/23
	0903 700771	V21/22/22b/23
Index Linked	0227 770403	V21/22/22b
Infocomm UK	0895 72021	V21/V22/V22
BIS.Intel Ace	0832 73003	V23v
Islington Bbs	071-704 0760	Hst
	071-226 1248	V21/22/22b/23
Jabulon Bb	0254 59352	V21/23/23v
Jersey Bbs	0534 37779	V21/22/22b/23
Jersey Opus	0534 39389	V21/22/22b/23
Jocks Awayl	031-225 5368	V21/22/22b/23
Jolly Fisherman	0754 67796	V21/22/22b/23
Jolly Roger	081-742 1640	V21/22/22b/23
Jusavo	0324 32414	V21/23
Just The Place	0705 258694	Hst
K-wood	0608 83458	Hst
Kashmir'S Bbs	0472 347882	V21/22/22b/23
Kernow Bb	0209 821670	V21/22/22b/23
Key-board	0908 668398	Hst
Keydata	081-676 0072	V23v
Kidlington Bbs	0865 56703	V21/22/22b
King Of The Castle	0233 620228	V21/22/23
Kirklees Opus	0484 665415	V21/22/22b/23
Kleopatra's Pyramid	0602 384281	V21/23/23v
Komputer Knldge	0844 274066	V21/22/22b/23
Kybernesis	081-673 7294	V21/22/22b/23
Labyrinth	051-724 4458	V21/23
Lamplight Qbbs	0705 811531	V21/22/22b/23
Laser Tbbs	0532 438430	V21/22/22b
Lau'S Ql Bb	081-751 6096	V23v
Lightfinger's Place	0202 485723	V21/22/22b/23
Linelight	0580 212043	V23v
Linx Bbs	0522 511277	V21/22/22b/23
Liquorice Allsorts	0633 279985	
Liverpool Mailbox	051-428 8924	V21/22/22b/23
Liverpool Ros	051-931 4271	V21/22/23
Loch lomond	0389 55762	V22/v22bis
Loft	0442 230461	V21/22/22b/23
Logical BBS	0772 623167	300-2400
Log On In Tynedale	0434 606639	V21/22/22b/23
London Bb	081-455 6607	V21/22/22b/23
London City Mag	081-468 7648	V21/23/23v
London Connexion	081-667 1313	V21/22/22b/23
London Embassy	081-366 1778	Hst
London Guest Hse	081-748 0974	Hst/v32
London Mail Centre	081-534 1200	V21/22/22b/23
London Metropolis	081-519 1055	V21/22/22b/23
Loony Bin	0703 787489	V21/23
Mabbs	021-444 8972	V21/22/22b/23
Mach II Bbs	0242 260 685	V21/22/22bis
Mactel Hq (grn Box)	0602 455444	V21/22/22b/23
Mactel Metro	081-543 8017	V21/22/22b/23
Mactel Phoenix	0473 610139	V21/22/22b/23
Madness Bbs	0603 300947	V21/22/22b/23
Magic Castle Bbs	021-430 3761	V21/22/22b/23
Magic Mushroom	0361 83641	V21/22/22b
Magnum	0274 547006	V21/22/22b/23
Magrathea	0376 24402	V23v
Manor	0980 863031	V21/22/22b/23
Marctel	081-346 7150	V21/23/23v
Matrix	051-255 0225	V21/22/22b/23
Mbbs Leconfield	0964 550745	V21/22/22b/23
Mbbs Mitcham lic	081-648 0018	V21/23
Medway	0634 280031	V21/22/22b
Mektronic Cnsltnts	061-773 7739	V21/22/22b/23
Mercianet	0203 611943	V23v
Merkinstead	061-434 7059	V21/22/22b/23
Merlin	0443 834179	V21/22/22b/23
Mgbbs	0443 733343	V21/23S
Micro Live Bb	081-567 6500	V21
Micro Update	081-877 1529	V21/22/22b/23
Microdeal	0726 65422	V21/22/22b/23
Micrology	0422 71921	V21/22/22b/23
Microviewl	081-509 0729	V23v
Midget Gem	0748 834836	V21/23
Midnight Caller	0633 279243	V21/22/22b/23
Mind Boggles	0362 762868	V21/22/22b/23
Mininet 3	0642 672813	V21/22/22b/23
Miracom Support	0473 232540	Hst
Mirage	061-652 1242	V21/22/22b/23
Mirror li	0628 810889	V21/22/22b/23
Mirrorworld/quest 1	0883 844044	V23
Mission Impossible	0602 654329	Hst
Mk Board	0908 671289	V21/22/22b/23
Mkbbs	0908 504556	V22/22b
Monkey Tree	0952 677002	V21/22/23
Monusci	0293 545665	V21/22/22b/23
Motor Exchange	0484 435314	V21/22/22b
Multi-bbs	041-649 9043	V21/22/22b/23
Murdoch'S Hangout	021-711 2620	V22/22b
Murky Caverns	081-426 9386	Hst
Mwcfe	0926 421844	V22bis
My Little Phoney	0865 773277	V32/HST
Nicc Mid-west	0341 250377	V21/22/23
Nite Life	071-976 6807	V21/22/22b
No Escort Required	081-200 3817	Hst
No.1 Bbs	081-958 1689	V21/22/22b
Noah BBS	0272 572322	300-2400
Norpac	0434 608324	V21/22/22b
North Wales Bb	0978 88372	V21/22/22b
North Yorks Qbbs	0423 868065	V22/22b?
Northern Lights	0768 773685	V22/22b
Norwich Onion Bbs	0603 423305	V21/22/22b/23
Nova	0455 553371	V21/22/22b
Nova-net	0274 370760	V22
Odd-ball	081-679 2583	V21/22/22b/23
Open Access	081-427 3974	
Optix	0482 872294	V21/22/22b/23
Organic Garden	081-464 3305	V21/22/22b/23
Out Of The Blue	081-668 7667	V21/22/23
Owl Service	0532 605876	V21/23
P'S & Q'S Tel	051-236 3105	V21/22/22b/23
Pacific Lightning	0732 845338	V22/22b
Packet Bbs	081-547 1479	V21/22/2
Packet Place	0484 435620	V21/22/22b
Palm Beach	0303 265979	V21/22/22b/23
Pazaz Viewdata	0383 620259	V23v
PC Access	071-608 0081	V21/22/22b/23
PC-Amiga Link	04023 84914	up to 2400
PC Forum	0322 335348	V21/22/22b/23
PC Serve Shop	081-864 2633	V21/22/22b/23
PC Serve Softnet	0895 420164	V21/22/22b/23
PC Serve Storehouse	0494 728094	V21/22/22b/23
Pc-vax Opus	081-800-3549	V21/22/22b/23
Pcamiga Bbs	0602 735119	V22/22b
Peacenet West	0895 448998	V23v
Pecan Software BBS	0272 248076	V21/22/22b
Penguin	0943 830820	V21/22/22b/23
Phantom	0226 340425	V21v/22v/23
Phoenix	0249 817704	Hst
Piston Popper	0424 853361	
Plug-ole	021-472 0256	V21/22/22b/23
Plus And Minus	0559 322766	V21/22/22b/23
Poacher	0476 62450	V21/22/22b/23
Polynet Bb	071-580 1690	V21/22/22b/23
Port Of Call	081-391 5779	V21/22/22b/23
Power Play Qbbs	0698 423669	V21/22/22b/23
Power Tower	0533 880114	V21/22/22b/23
Prestonet	0772 612462	V23v
Project Bbs	0384 401770	V21/22/22b/23
Prometheus	081-300 7177	V23v
Proximity	0793 480028	V21/22/22b/23
Publishing Shop	091-261 5228	V21/22/22b/23
Purely Pc	0232 645942	V21/22/22b
Pyramid	071-239 0871	V21/22/22b
Pyroto Mountain	0895 59071	V21/22/22b
Quasar	0846 693067	V21/22/22b
Really Interesting	0582 414991	
Reflex Bbs	0703 685527	V21/22/22b/23
Regency Bbs	0542 33050	V21/22/23
Remotelpcw	0555 851887	V21/22/22b/23
Rivendell	0602 640488	V21/22/22b/23
Rm Tech. Support	0865 796431	V21/22/22b/23
Road Runner	061-483 4105	V21/22/22b/23
Roamer I	0292 45345	Hst
Royalink Uk	0962 66807	V21/22/22b
SAC Bbs	0242 260685	V21/22/23/22b
Sas Bbs	0742 325232	V21/22/22b/23
Satellite Southwest	0392 53116	V21/22/22b/23
Scabs	0909 479080	V22bis
Scary Monster	0734 320297	Hst
Scot Air	0505 36036	V21/22/22b/23
Scothelp-St	031-343 6368	V21/22/22b/23
Scottish Opus	041-880 7863	V21/22/22b/23
Scottish Wildcat	0674 671141	V21/22/22b/23
Scs One	0444 236002	V22b
Sector	0772 454328	V23v
Semaj Qbbs	0303 862415	V22/22b
Sentinel Bb	0628 781429	V21/22/22b/23
Shades	0342 810905	V23
Shadowfax	0252 528146	V21/22/23
Shadowland	081-897 0488	V21/23
Shasby'S Lair	0772 561066	Hst
Sherwood Forest	0602 397113	V21/22/22b/23
Short Circuit	0273 462967	Hst
Sid (acorn Service)	0223 243642	V23v
Signal Box	081-337 6583	V21/22/22b/23
Sin Bin	0532 661536	V23
Sirius	081-542 3772	V21/22/22b/23
Sirius Ii	0494 778425	V21/22/22b
Skull's Tower	081-943 1194	V21/22/22b/23
Sky-line	0603 742273	V21/23/23v
Skyline 1	0234 741691	Hst
Softmatic Bbs	0733 322540	V21/22/22
Software Source	0892 661149	V22/22b
Sorcerer's Dungeon	0636 815705	
Sounds Of Mercia	0203 682896	V21/22/22b
South Lincs BBS	0780 63954	
Sparx	0793 480287	V21/22/22b/23
Split Infinity	0342 712248	V23v
Pook Bbs	0268 767365	V21/22/22b/23
Sphere BBS	0294 221350	V21/22/23/22b
Spuds Xanadu	0203 695266	V21 V22, V23, V23b.
Sputnik Spitfire	0501 31754	V21/22/22b
St London Bbs	081-443 2432	V21/23
Stabb	0793 855176	V21/22/23/22b
Staines Bb	0784 465794	V21/22/22b/23
Starbase One	071-733 3992	V21/22/22b/23
Steve and Jackie's	0703 650037	V21/V22/V22b/V23
Strange Brewl	081-665 5038	V22/22b
Stun User Network	061-429 9803	V21/22/22b/23
Summer Wine	0484 653234	Hst
Sunburn Inc.	021-449 5269	V21/23
Super Ops Bbs	0782 284081	V21/22/22b
Swindon Newc Bb	0793 616683	V21/23
System-c-v	0403 50607	Hst
T.a.b.b.s.	0533 517615	V21/22/23
Tabbs	0225 743797	V21/22/22b/23
Taecomm	0994 6709	V21/23
Taff'S Retreat	0834 4562	V21/22/22b/23
Tardis	0772 27236	V21
Tasque	0355 222664	Hst
Tasug Opus	0904 760129	V21/22/22b/23
Tavern	081-445 6514	V21/22/22b/23
Tbbs-rovoreed	081-542 9767	V21/22/22b/23
Tequila Sunset	0703 867786	V23v
Terminal Net 5	0402 456135	V21/22/22b/23
Terminal-net	081-423 5262	V21/22/22b/23
Tharr Bbs	0234 261804	V22/22b
Third Wave	071-585 3163	V21/23
Three Kings	0354 56267	V21/22/22b
Track 83	0953 851351	V21/22/22b/23
Transylvania	0274 621668	
Tranz-com Bbs	081-952 6273	V21/23
Trinity I	0392 410210	V21/22/22b/23
Trinity Ii	0367 22764	V21/22/22b/23
Tug Ii	0905 775191	V21/22/22b/23
Twilight Zone	081-788 0884	V21/22/22b/23
Twilight Zone Ii	071-608 1485	Hst
Uk Healthlink	0942 722984	V21/22/22b/23
Unisys Etoi Bbs	081-453 5739	V21/22/22b/23
Unit One	0285 713688	V21/22/22b
V.i.t.a.s.	021-749 5860	V21/23
Valente'S Bbs	071-978 2078	Hst
Vector System	0329 45824	Hst
Viking East Anglia BBS	0255 503048	V23v
Village	081-464 2516	V21/22/22b/23
Village Fayre	081-841 5971	V23
Voyager Bbs	061-725 9580	V21/22/22b/23
West Norfolk	0553 761290	1200/2400
White Lightning	0635 37259	V22/22b
Whitehall Pent	071-930 3903	V21/22/22b/23
Wild Imaginings	091-263 4303	V21/22/22b/23
Winchester Remote	0962 69322	V21/22/22b/23
Wolver'ton Ros	0902 745337	V21/22/22b/23
Womble Base	081-979 9606	V23
Woodgreen Bbs	081-889 5624	V21/23
Yugo Bbs	0734 753648	V21/22/22b/23

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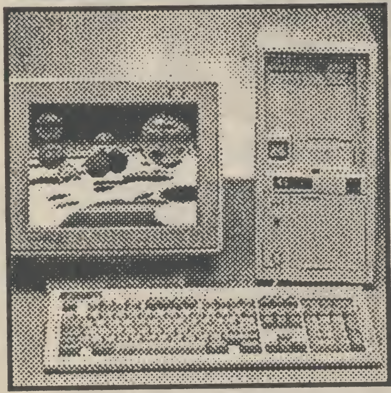

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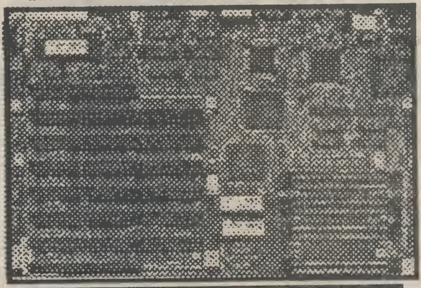

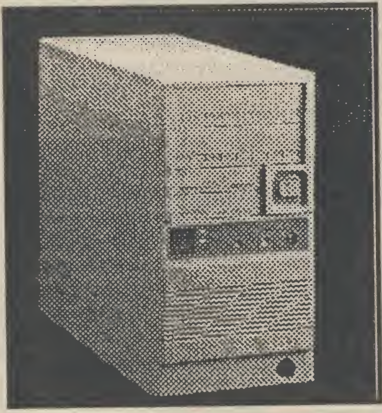

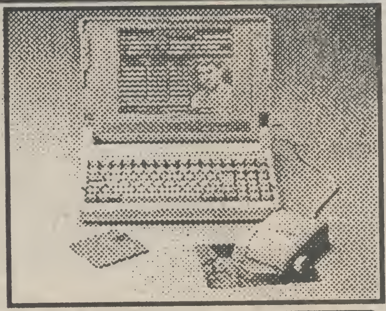

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Tim Smith's CENTREFOLD

Write to 30 Monmouth Street, Bath BA1 2BW [illegible]

OPENING TIME

Er... Centrefold. Let's just call it Centre for the moment and forget that it's a page floating around somewhere in the middleish of the mag.

I think it had something to do with mentioning the PCW a few weeks ago in such glowing terms. Still we can't moan really can we, a page of compact rib ticklingness (*or at least a page of you – Sub*) will suffice – it's not the quantity, it's the quality that counts. Frankly I work on the principle that computing is making everything in the world smaller by the minute, supercomputers in the hand, colour screens the size of matchboxes. And being only four feet three myself this is a trend which I find admirable.

Anyway, what's been happening this week. Future Publishing has announced some more magazine launches, recession? We dismiss it. So everyone here as been down at the local bistro L'Expensive Vache, celebrating. Antoine Le Monde de Canard, the owner of said restaurant, has a great line in artistic erotica, a delicious chocolate cream pie and an Archimedes which seems to run Zarch non-stop.

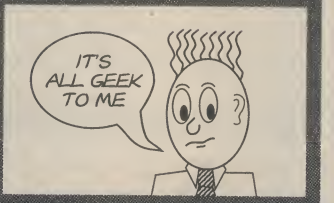
PLAYING FOR KEEPS

We talked of a software house last week, which for purposes of not getting slapped round the inside of the thigh with a wet fish, I did not name. This week there's a much more pleasant story . . .

Did you see the Super Bowl? I think it consisted of two teams of huge American lads with shoulder pads (*you mean that's not their real shape? – sub*) called the Sexy Sloux and the New Yorkshire Big Chappies hammered hell out of each other for a few hours.

Anyway, a couple of hacks from sister magazines went up to Electronic Arts in order to play them at *John Madden Football* on the Megadrive. Guess who won? We did! Normally I wouldn't class myself along with the other hacks, but everyone loves a winner.

THE GEEK


IT'S ALL GEEK TO ME

This week.... he got beaten up by his brother's hard disk

LETTER SPRAY

This week you can see Tim Smith being roundly abused by a range of irate readers who disagree about his views on nearly everything.

Dear Tim,
Why are you always going on about machines which you don't actually own? It's all very well trying to be funny, and I say trying because more than often as not (*! – TS*) you're not, but why also try to make people think that you're something which you are not? Just get on with the humour if you can and stop the bragging.
Yours, Robert Dawson, Calcott, Berks

Dear Robert,
How do you know that I don't have these machines then, eh? You don't do you? You're presuming aren't you? Well stop presuming and I might stop bragging.

Dear Tim,
Please stop these bloody stupid Sunday Sport type stories you little *****
Yours, Anon

Dear Anon,
As you will be aware I had to cut this letter massively because of the foul and abusive language therein.

To use an oft quoted phrase from Shakespeare's immortal Othello, when Iago turns upon a jealous Othello and says:" It's not clever nor grown up to swear."

Dear Mr Smith,
Thanks for the Geek, he's really quite good, grovel, grovel.
Yours, Susan Davidson, Aberdeen

Dear Sue,
What, no abuse? The readers will be upset

FACTS ALOT

One of the strangest phrases ever to crop up in programming was the Crippled Leap Frog Test. The only thing anyone knows about it is that it is a variation on the Leap Frog Test.

The Bell 103 low speed modem standard is the most widely used in the United States

Channel Four's *Manageress* never actually turns her PCW on.

TANDON 286 CONTROLS WORLD BANKING SYSTEM

A CENTREFOLD EXCLUSIVE

It can be exclusively revealed that a stand alone Tandon laptop is the core system behind the little known Conspiritorial Masons, P2, G7, Triad, Tom-Tom Macoute, Tong World Banking Cartel and Social Club.

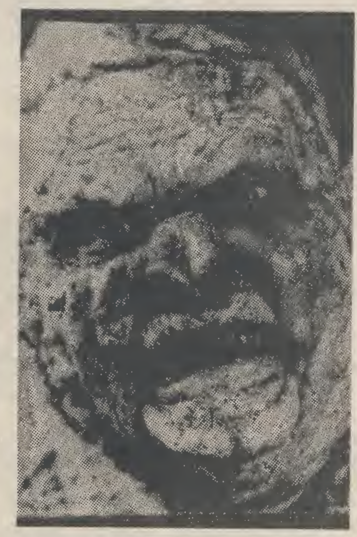
The CMBC are known to:

- Eat babies
- Plant viruses for fun
- Enjoy the way Wimbledon play
- Not back-up data
- Run the economies of most western countries

The CMBC as it is known has been underpinning western finances for some 25 years without anyone knowing. A reliable source, Mr Charlie Gingridge of 14 Halpern Halls, Brislington, who wishes to remain nameless for obvious reasons, but asked too damn much for the story, told a Centrefold reporter that until December 1990 the CMBC had run the business from a CPC464. They only upgraded when their pirated versions of *Protext* and *SuperCalc 2* corrupted: "They had made no back-ups", slurred Gingridge over a blatantly tapped telephone line from his secret hideout at 11b Sauté Street, Sutton Coldfield, "and they were all very angry about it. They decided on the Tandon because the Grand Aardvark himself received the machine with software for Christmas."

During the period of changeover five countries applied for receivership, three states put all their money in plastic carrier bags and left for Australia, and Great Britain applied to the Nat West for a £200,000,000,000 personal loan over 18 months.

A spokesGrandMoose for the CMBC denied the existence of the organisation when we spoke with him: "Never heard of them. What is this *Beadle's About* or something? I'm just a fishmonger." When our reporter explained that he had one trouser leg rolled up and his left arm through his legs, the spokesGrandMoose was more forthcoming: "Gaw blimey old chap yes, the CMBC have been going for years. The Stock Exchange Crash, that was us after an office party. The Great Depression, that was us after another office party. We love a good laugh. Of course we have other computers, we use a Cray to work out the holiday roster and an Amiga to play *Kick Off*, but apart from that we're not really into high-tech. You're not going to print this are you?"



• *A stoney faced spokesperson for the CBMC.*

FACTS ALOT

The APL (A Progamming Language) er... programming language was developed at Harvard and IBM between 1956 and 1967. The ubiquitous Ken Iverson was one of the people behind it.

LISP (List Processing) was invented by John McCarthy at MIT in 1957.

Ladbroke Computing International

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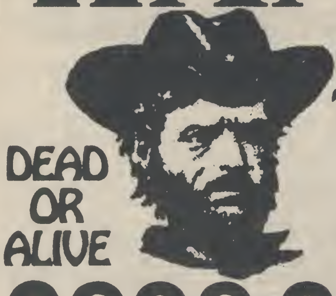

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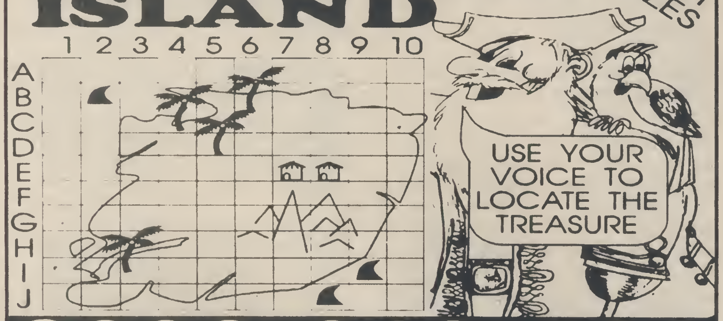

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◆ GOODS WANTED

WANTED: Any working home computer of any make. I will swap my six personal money making business manuals, total value £65.90 for one. Telephone: (0949) 831206, ask for Mr. M. Tomlinson.

ST owners! Anyone want to swap demos, PD? Send your list for 100% reply: M. K., 7 Montgomery Street, Birmingham, B11 1EN. All letters replied.

SWAP Devpac II (Amiga) for Argasm. Phone only at weekends, (02477) 71888. Might pay a bit as well.

PASCAL compiled (commercial) for Commodore CBM, Amiga wanted. Will pay or swap for other Amiga software etc. Richard 061 485 6580 after 6pm please.

WANTED: 1 meg D/S drive for ST internal only, must be cheap or swap my top software or mixture of cash and software to: Paul, 3 Moorend Ave., C'wood, Birmingham, B37 5SD.

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APOLLO Modem (BBC Watford Electronics) ROM software and/or manuals needed for (perhaps) working modem (info needed). tel: Ed, 081 682 0745. Write: 116 Eswyn Road, Tooting, London, SW17 8TN.

WANTED Amiga: mouse, manuals, softwae and Mastersound. Cash waiting for any of the above. Tel: (0630) 58329 after 5pm.

WANTED: Atari ST system, fair price paid for good system offered. Telephone (0495) 272358 no silly balloon inflated prices please.

WANTED: Amiga Action Replay cartridge mark II. Swap for: Carrier Command and Starglider 2 or offer up to £30. Phone Simon (evenings) on (0623) 644179.

WANTED: Vic 20 power pack. Tel: Northampton (0604) 700632.

ATARI 1040 wanted. No monitor neede, but I am also interested in music software such as Creator or Cubase (with manuals). Ring Mike daytime: 071 926 4673 eves: 071 587 1327.

WANTED: Amiga 2-3 meg demos. Good price paid. Tel: Viper on (0473) 713715 between 6-9pm only please!

WANTED: Cheap computer for friend. Atari to Spectrum. Anything working considered. Please send details to: Nigel Richardson, 17 Butter Hill, Carshalton, Surrey, SM5 2TW.

WANTED: A500 with Fatter Agnus and Kickstart 1.3. Also wanted Megadrive Pal. Good prices paid. Phone (0424) 211928 after 6pm, 7 days, consider Pix with Lynx, Record deck, or TV400.

COMMODORE Amiga A500, no fancy bits, or games or monitor, just main machine and power supply, plus modulator. Contact Tim on (0353) 648935 to discuss deals any time.

◆ SERVICES

◆ PERSONAL

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SCANNING service, up to A4 200dpi 1meg or PCX format for IBM PC or Atari ST 3.5" disk. Phone John 081-767 4761, almost anytime.

EYECATCHING custom written Atari ST(E) demos for use in shop windows or user groups etc. Send for free info sheet to: T.N.P. Productions, 44 Laund Nook, Belper, Derbyshire, DE5 1GY.

AMIGA midi help needed desperately! Pay negotiable for anyone willing to make a South London home visit. (Dr. T or Music-X). Ring Mike daytime! 071-926 4673 night 071-587 1327.

SCANNING and digitising. Lots of Clip Art available in various formats including 1Mg, IFF/ILBM, Tiff, Gif, Macpaint, Printmaster, Degas, PCX. Send SAE to: 53 Lenaghan Park, Belfast, BT8 4JB.

WANTED: Amiga A500 users interested in forming a user group. Also ust write if you're into programming, PD, swaps, etc. Stephen Hamer, 98 Crebilly Road, Ballymena, County Antrim, BT42 4DS.

WOULD Roy Woodfine please contact Clive Parker about the hard disk drives. I am still at the same address. Phone (0275) 375496. Please return the money paid.

◆ ANNOUNCEMENTS

TYPECAST! New PD library for the Atari ST/STE. Solely for DTP, WP and Art. No games, send SAE + disk for disk catalogue to: Paul Sealy, 31 Hartfield Crescent, West Wickham, Kent.

ATARI ST

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A fast, friendly, development system for GEM on the Atari ST, comprising GEM text editor, macro cross-assembler, linker and RS232 transfer facility for downloading to the target machine.

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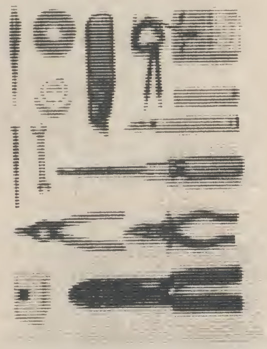
CIRCUIT CITY



Many of the ideas and projects in Circuit City can benefit from books. Keith Pomfret dusted his bookshelves and found a rain forest of knowledge hiding on the teak.

If you are going to delve inside your machine, it's important that you know what is in there and what it does. The book that came with the machine is generally next to useless when it comes to a sortie inside the machine and beyond the warranty

An afternoon in a good library or bookshop will show you that everyone and their pet dog is writing about computers nowadays. In the local bookshop, the technological revolution has beaten religion into second position for shelf space. A book on the operating system of the computer isn't too difficult. Machine-specific references on the documented bits that the manufacturer doesn't mind us playing around with are easy to come by, but general books on what does what and how are rarer.

As bookshops don't generally keep a pet wirehead on hand to consult you're on your own. The first thing to get is the technical manual for your machine and the best place to get it is from the manufacturer. It sounds easy if you say it quickly. However, persuading some manufacturers to let you know what's going on inside is a task in itself.

No-one wants to help you because they dissaprove or it's their living. You've hardly said "help me," before they run out a list of excuses and grumblings about qualified personnel and invalidated warranties.There's no simple way, but I'm sure with a little application (and a lot of phone calls) you can do it.

After you have the tech manual (and it's not always an easy book to get), it's an idea to try and learn what all the different components can do and a bit about the history of computing and the theories of logic and calculation that lie behind the keyboard.

SECOND-HAND?

If you're lucky you'll have a couple of second-hand bookshops close by. While these aren't much help for machine specific information, there are generally a few books on the shelves about the theory of things. It's easy to look at the chips in your computer and ignore them as 'complicated circuits' but the only thing that differs between the microchip and the traditional circuit is scale. Inside the black plastic body of a chip there is nothing more complicated than a transistor and if you can learn how basic transistors, switches, diodes and capacitors work, you will be a long way towards understanding microchips.

A book picked up from the junk box of our local bookshop for 20 pence entitled *Electric Currents and Circuits* has been the basis of all my articles on how basic components function. Three text books long discarded by an HND student have offered me practical solutions, ideas and most of all help. These volumes cost me the princely sum of £2.25 for the lot.

MACHINE SPECIFIC

Computer shops and radio rallies proved a useful source of manuals for obsolete kit. Paragraph one of Murphy's Law requires that whenever a piece of equipment is sold, borrowed or given away, all of the relevant documents must be removed and hidden. Paragraphs two and three of the said law require that the person purchasing the equipment knows nothing about it and knows no-one else with any knowledge.

Thus the manuals and documents are passed around bookshops, bootsales and radio rallies until they surface, dog eared and mildewed several months later.

Another focal point for manuals, etc, is the regular All Formats Computer Fair at the Horticultural Halls in London. I've found several useful machine specific books and manuals at the All Formats including a manual for an obsolete IBM line printer, a full technical reference for an Osborne (and the Osborne to go with it) and even a schematic for a modem that had been on the shelf for two years because we had no information on it. ■

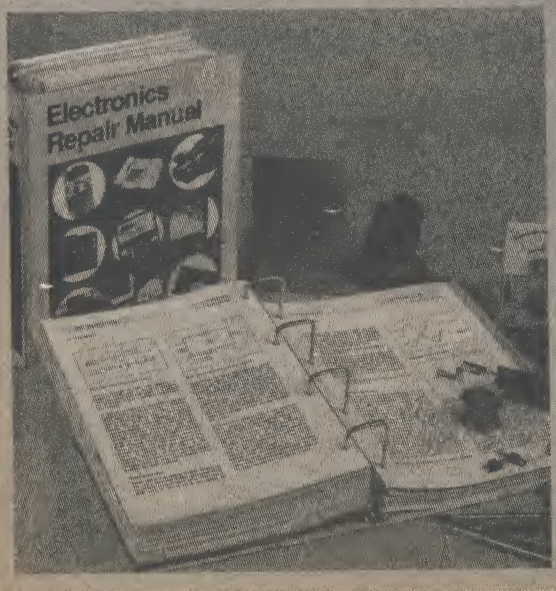
A GOOD READ

Instead of searching endlessly through rows and rows of book shelves – a much easier way to find the books you want is to use the Dewey Decimal System. Most public and many academic libraries categorise their books using this system – each subject and its divisions have a classification number and these numbers are further sub-divided by a decimal point (hence the name). Most libraries put the classification number on the spine of the books and somewhere on the appropriate bookshelves. For example, the *Fax User's Guide* is in category 621.385.

The 600s are technology (applied science) and section 621 is applied physics. Not perhaps the first place that you'd look for a book on fax machines, but as you peruse the Dewey list, you'll find clues to the whereabouts of books that you'd never have guessed.

Categories 004 and 005 in the general section are computer science/data processing and computer programming respectively. It's worth asking the librarian for a photocopy of the Dewey classification list in order to enable you to do a bit of digging on your own.

ALL IN ONE



Another solution to the knowledge problem is the *Electronics Repair Manual*. This is a weighty volume that tips the scales at £44.95, but is well worth the cash if you want to delve into anything electronic. It is a large format loose leaf binder with over 800 pages including checklists, troubleshooting, supply information, data, basic principles and most importantly, safety.

The loose leaf format means that it will lie flat on the bench. More importantly, the publisher uses this loose leaf format to allow updates by either replacing sections or adding to them. The supplements come in at at least 160 pages and are billed at £22 plus post and packaging.

The Electronics Repair Manual is available from WEKA on 071-388 8400. For a full depth review of its 800 plus pages keep your eyeballs welded to Circuit City.

USEFUL NUMBERS

Here are a few Dewey numbers you may find useful in the public library. It isn't a complete or comprehensive list but it's a start.

003	Systems
004	Data processing, Computer science
005	Computer programming, Programs, Data
006	Special computer methods
016	Dictionary catalogues
118	Force and energy
119	Number and quantity
160	Logic
161	Induction
162	Deduction
167	Hypotheses
168	Argument and persuasion
330	Economics
345	Criminal law
346	Private law
384	Communications, Telecommunications
389	Standardisation
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530	Physics
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102 Key keyboard	102 Key keyboard
Serial and parallel ports	Serial and parallel ports
4 Expansion slots	6 Expansion slots
16-Bit 800x600 VGA card	16-Bit 800x600 VGA card
14" Colour VGA monitor	14" Colour VGA monitor
MS-DOS 3.3 & GW BASIC	MS-DOS 4.01 & GW BASIC
£895.00	£1395.00

Trust 386-33 VGA Big Tower £1799.00
80386 33Mhz; 2Mb RAM; 64KB Cache memory (Max 128KB); 1.44Mb 3.5" FDD; 40Mb 28ms Hard drive; 102 Key keyboard; 16-bit 512K VGA card; VGA colour monitor; 7 Expansion slots (1 8-bit & 6 16-bit); 1 serial 1 parallel.

Trust 486-253 VGA Big Tower £3795.00
80486 25Mhz; 4Mb RAM; 8 Expansion slots (2 8-bit & 6 16-bit); 1.44Mb 3.5" FDD; 210Mb SCSI hard drive; 1 serial 2 parallel; 102 Key keyboard; 16-bit 1Mb VGA card; VGA colour monitor.

Hewlett Packard DeskJet 500 £499.00
Inkjet printer; virtually silent; HP LaserJet Compatible; 300 dpi graphics; several fonts; automatic kerning; superb quality - almost as good as a laser; range of font cartridges available; 3 year warranty.

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All Citizen printers come with a full **2 year** Parts and Labour Warranty.

120D+ (Parallel) £145.00
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Both versions have: 120cps draft; 25cps NLQ; 2 NLQ fonts; 4K buffer; IBM & Epson emulations; Both friction feed and pull tractor; 80 columns.

124D (Parallel) £215.00
80 column; 24 pin; 120cps draft; 40cps NLQ; 2 NLQ fonts; 8K buffer; Epson & IBM emulations; Partial NEC emulation; Paper park; Short tear off; Easy-use control panel.

Swift 9 pin £188.00
3 NLQ fonts; Speeds up to 213cps; Paper parking & short tear off; Epson & IBM emulations.

Swift 24 pin £289.00
192cps draft; 64cps NLQ; 360dpi graphics resolution; Full paper parking; LCD control panel - no dip switches needed; 4 Macros; Epson, IBM & NEC emulations; Font cards available; Push/pull tractor; Colour option.

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WHOLE WIRED WORLD

A Wordperfect upgrade, a cheap answer to PostScript and much more from our man across the Atlantic, Steve Gold.

WORDPERFECT 4.1 UPDATE

Another new edition of *WordPerfect 4.1* for the Atari ST has begun shipping in the US. This latest version, with file dates of the 6 December, has several enhancements over and above the earlier, 1November 1990, update.

According to Mike Squire of the *ST Report* newsletter, the new version is well-behaved with a wide variety of mouse and screen accelerators, so the the package should work with the Mega STE series, as well as the TT030 machines. WordPerfect, in fact, says that the new update is guaranteed compatible with the TT030 machines. *ST Report* is more cautious, probably because there are so many varieties of the TT030 in circulation.

The key features of the 6 December update are that the initial colour palette resembles that of the GEM Desktop, and if colours are changed within the *WordPerfect* environment, the colour combo is retained for future sessions. When the package is exited, the GEM Desktop's colour palette is unaffected by the changes.

While WordPerfect is emphasising the update's included support for the TT030 series, *ST Report* notes that this new version is infinitely less buggy than the 1 November edition.

OK. Now for the bad news. Even if you upgraded to Version 4.1 with the 1 November 1990 edition, you'll still have to pay $15.50 plus shipping for the new version. But with around $10 to add for airmail postage and packing, that's not too bad.

Strictly speaking, UK users of *WordPerfect* should contact the company's UK office. While yours truly has found the UK staff efficient, even I doubt that the 6 December edition of *WordPerfect 4.1* is available from the UK offices, so I'd advise interested readers to contact WordPerfect US direct with their credit cards at the ready.

Contact: WordPerfect Corporation Atari Products Division, PO Box 731, Orem, UT 84059-0731, United States. Tel: 0101-801-225-5000.

BUDGET TIMEBASE CORRECTOR

One of the biggest problems with video editing systems on the Amiga and even PC-compatible machines is that the video signals need some form of timebase correction to stop the images jittering. This is why video editing systems, even on the Amiga, end up costing well into five figures (and that's dollars and not pounds).

Until now, that is. Digital Processing Systems (DPS) of Scarborough, Ontario in Canada, has come up with a Personal Time Base Corrector which can be used with the Amiga and PC compatible machines.

The Personal TBC system consists of a PC-style card that fits the Amiga (without the need for a PC bridgeboard) or a PC compatible computer. The $995 system is designed to be compatible with Newtek's Video Toaster system as well as the majority of other video editing systems for the Amiga and the PC.

The system works with both PAL and NTSC video signals being fed into a personal TDC card and then into the video editing software environment. Up to four cards – and therefore video sources – can be used with each PC or Amiga, and DPS reckons the results are of a broadcastable standard. Genlock capability is also supported as standard.

Contact: Digital Processing Systems, 55 Nugget Avenue, Scarborough, Ontario M1S 3L1, Canada. Tel: 0101-416-745-8090 Fax: 0101-416-754-7046

ULTRASCRIPT FOR ST DUE SOON

UltraScript is the name of a new page description language (PDL) that is very close to PostScript, yet is a whole lot cheaper to license. The software of the same name – due out later this year for the Atari ST – is a joint development between QMS/Imagen and Atari, with Atari handling the marketing.

The full version of Ultrascript is scheduled for shipment in the third quarter of this year. According to the *ST Report Confidential* newsletter, the software operates as a terminate and stay resident (TSR) package that intercepts printer calls from most DTP software on the ST, routing it through the necessary printer drivers to achieve the necessary graphics and fonts.

What's most attractive about UltraScript is that its able to convert pure UltraScript print commands and route them out of the ST as PostScript commands. This means that DTP systems based on UltraScript can drive PostScript-compatible laser printers without the need for an expensive PostScript license! Watch this space.

AMIGA 3000UX ARRIVES

After several months of waiting, Commodore's Amiga 3000UX Unix workstation is now shipping. At least, that's the word from the company's US headquarters.The machine runs AT&T's Unix System V Release 4 operating system and is based on a standard 16MHz 68030 Amiga 3000 chassis.

Two versions of the machine are available in the US, the Model UB with 4Mb of RAM plus 100Mb hard drive at $5,499; and the Model D with 8Mb of RAM and a 200Mb hard drive at $6,999.

Both models can be expanded to 18Mb on the motherboard and feature an Ethernet board, Unix system software, mouse and a single 3.5 inch floppy drive as standard within the above prices.

What's interesting is that Commodore is claiming that the 3.5 inch floppy drive is multi-format. From that I'd guess that the drive will read and write to pretty well any 3.5 inch disk format – maybe even Apple Mac disks.

Contact: Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380, United States. Tel: 0101-215-431-9100 Fax: 0101-215-431-9156. ■

PORTFOLIO PROGRAMS A-GO-GO

Since Atari US shuffled its pricing on the Portfolio at Comdex Fall last November, sales of the machine have gone through the roof, with the predictable result that there has been an explosion in the amount of software developed for the machine.

Gregg Pratt over at Atari US is co-ordinating a lot of the packages for the tiny PC. His list of available packages is growing almost daily, so it's worth dropping him a line or a fax to enquire about specific packages.

In the meantime, here's a short list culled from the Atari Portfolio forum on Compuserve:

POWER BASIC (Spectra Publishing) is a full-fledged powerful BASIC compiler that allows users to write application programs for the Portfolio that can be tailored for specific needs.

PORTFOLIO STOCK TRACKER (Lifestyle Software) keeps track of user's stocks and shares. The program supports hard copy printout.

ATARI TURBO TRANSLATOR (Organised Solutions) translates approximately 1,000 phrases and 2,000 words into six languages (English, Swedish, German, Italian, Spanish and French).

PERSONAL FINANCE (Bytesize Software) is an easy-to-use tracking program that allows input and sorting by category. This software package can also be used to record time/expenses for anyone who has to maintain an hourly time sheet for billing purposes.

SCIENTIFIC CALCULATOR (Atari) contains approximate scientific transcendental functions so that users no longer need to carry a scientific calculator in addition to their organiser.

PORTFOLIO BRIDGE BARON (Lifestyle Software) is for people who want to learn how to play Bridge or improve their game strategy. It includes 91 challenging deals as well as a variety of both elementary and advanced declarer strategies.

PORTFOLIO WINE COMPANION (Lifestyle Software) allows users to catalogue their wines, choose just the right wine for the occasion and keep track of their wine cellar value and composition.

PORTFOLIO ASTROLOGER (Lifestyle Software) uses the three main astrological calculation bases (Placidus, Koch, and Equal House) to provide a complete natal chart, influences, a planetary map, daily data and even the interpretation of the data. The program allows for hardcopy printout.

Further details from: Greg Pratt, General Manager, Atari Computer, 1196 Borregas Avenue, Sunnyvale, CA 94088, United States. Tel: 0101-408-745-2000 Fax: 0101-408-745-2088.

● If you're on-line, the Atari Portfolio forum on Compuserve has to be *the* source of public domain and shareware software for the pocket PC. The forum has more than 2,000 members, meaning that the £7.00 an hour off-peak it costs to access Compuserve's direct dial port in London is well worth the money. Tel 0800 289458.

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A2000 internal drives	£59.95
A3000 internal drives	£59.95
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90Meg SCSI 3.5" hard drives	£349.95
136Meg SCSI 3.5" hard drives	£475.95
182Meg SCSI 3.5" hard drives	£535.95
A590 CMOS RAM chips (512K)	£25.00
B2000 18 pin DRAMS (2Meg)	£109.95
256*1 DRAMS 150nS	£1.25
1.3 ROMS	£34.95
68000 chip (8MHz)	£12.95
68000 chip (14MHz switchable)	£39.95
68010 chip	£24.95
68020 chip (20MHz)	£79.95
68030 chip (25MHz)	£195.95
68030 chip (33MHz)	£275.95
68881 co-pro (12MHz)	£49.95
68881 co-pro (16MHz)	£54.95
68881 co-pro (20MHz)	£75.95
68882 co-pro (20MHz)	£99.95
68882 co-pro (25MHz)	£149.95
68882 co-pro (33MHz)	£179.95
68882 co-pro (50MHz)	£399.95
A3000 RAM 256*4 80ns 1Meg	£65.95
A3000 RAM 1024*4 80ns 4Meg	£299.95

512K with clock + switch	£32.95
IN500 with 1.5Meg installed	£99.95
SIN500 OK	£85.95
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■ HELP! Eight score draws

I have just started BASIC programming and have written a very simple program to provide me with 11 random numbers for a pools coupon. I would like to be able to sort the numbers into ascending order for ease of entry and have read of various sorts, eg, bubble and shell – however I cannot successfully write any sort into my program. I would be obliged if you could help please. Could you also please tell me if there is a short program to obtain 11 different numbers in the range 1 – 58? Mine does seem rather long-winded.

Trevor Cobbe, Leicester

I'm not falling into the trap that you've set me. The last time that I dusted off my programmers hat to answer a query, several better/faster/more elegant solutions landed in the Tech Tip mailbag. I will however risk starting a 'my favourite programming language is better than your favourite programming language' debate by throwing the challenge to all our codeheads. So there you have it. Go forth and may the source be with you. (*Groan – Ed*)

■ STAR LETTER! But no prize

Here is some help for George Garven, Ayrshire whose problem you entitled. BAH! Silly boy. There are always a couple of good reasons for having a TV/monitor.

1) It's the only type of monitor you possess, and you will be surprised at the quality of the display in all modes except for interlace.

2) It's the only TV you possess that gives better quality than a modulator. The problem occurs when a member of your family wants to watch *Home and Away, Neighbours,* etc. This means you have to close all applications and save work 20 minutes before these programs come on, because the computer automatically takes over the TV set when switched on, thereby not allowing the composite picture or sound through no matter which channel is selected.

The problem is the Euro connector. If the source ie, Amiga/videos supplies the switch over signals the set is automatically put in monitor mode. To stop this from happening, open up the connecting cable at the 23-pin connector Amiga side, locate pin 22 and pin 23 – these should be clearly marked. As it is these pins that supply the source signal for the automatic changeover they have to be desoldered and cut back or capped so they do not touch each other or anything else. Once this is done you can reassemble the connector, plug in and switch on.

You can now select between monitor or TV sure saves powering everything down every time someone wants a look at the teletext to see if his gee gee fell in the last race. *New Computer Express* is great, good work men. (*Don't forget us wimmin – sub*)

V. Keizars, Edinburgh

The thought of allowing anyone to interupt a session on the Amiga to view antipodean dross where the music is only one step up from a Z81 is enough to drive anyone to distraction.

Honestly, I've seen animation programs on the Amstrad CPC with more realistic movement than the acting on Australian soaps. Still, there's no accounting for taste and with the current climate, I have to admit that it's not a bad idea being able to flick to a TV for the latest news reports. Thanks for your input on the subject. If I was a sadist, I'd send you a video of *Prisoner Cell Block H* for the week's star letter but I'm not so I won't.

■ TIP! Spectstrad monitor

I recently purchased an Amstrad CTM664 monitor (the one that comes with the CPC6128) in the January sales for only £20 with the express purpose in mind of converting it to work with a 128K Spectrum. I have now completed this relatively simple conversion and thought that the information I had gathered to complete the conversion may be useful to your readers.

The simpliest conversion is for owners of Plus 3 and Plus 2 Spectrums, and consists of an adaptor lead to fit between the spectrums RGB/Peritel socket and the monitors input lead. You will need an 8-pin male 180 degree DIN plug (for the spectrum end) and a 6-pin female 240 degree in-line socket (for the monitor end). Both of these are easily available from Tandy.

Five connections need to be made between the plug and the socket. It is best to use four core screened cable, and use the screen to connect between pins two and five. The earlier Sinclair black cased 128K Spectrum uses a separate bright line which is not accepted by the monitor. It is however possible to combine the bright signal with the red, green and blue signals so that the colours are displayed correctly.

The modification can be included in the adaptor cable between the Spectrum and the monitor and consists of three small signal diodes (IN4148 or similar), and three 75 ohm resistors. Each diode needs to be paired with a resistor, with the end of the diode marked with a ring on the far side from the resistor. Connect the diode end of all three pairs to the bright output from the computer (pin three), and connect the loose resistor ends of the pairs to the red, green and blue outputs (pins six, seven and eight). The diodes must be the right way round for the modification to work, but the orientation of the resistors is not important.

As the CTM664 monitor does not have any sound output a separate amplifier will be needed to hear the 128K's sound. I used the Tandy mini amplifier/speaker (£10) connected to the Spectrum's tape/sound socket. It is also possible to use the monitors redundant power supply line to power the amplifier.

David Smith, Sunderland

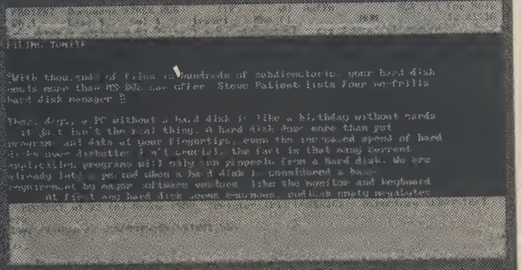
Yet another use for the Amstrad monitor. We had one in the office attached to an Amiga, a colleague swears by it for his STE and I'm told that they even do quite a good job when attached to an Amstrad CPC.

■ HELP! Word processing package

I am searching for a word processing package that would most closely match my requirements and wonder if you could make any useful suggestions, as I am unable to ascertain the information from your WP shopping guide or from advertisements; nor do I wish to be lumbered with a large phone bill making enquiries on various items. Using an Atari 520STE, my requirements would include proportional spacing facility, the ability to call up multiple font styles and sizes from the screen (these being displayed as they would be printed), a spelling checker and if possible (although not essential), a thesaurus. I would also seek the ability to switch off automatic page numbering. Furthermore, this would hopefully fit within an £80 budget. Would I need to expand the memory to cope with such a requirement?

I. Spake, Feltham, Middx.

I'm not sure that your requirements can be matched within your price range. I'd have thought that the closest that you'd come to your ideal wordprocessor would be *Protext* 4 from Arnor at around £100. This supports proportional printing, has a good quick spelling checker and is used professionally by several of the mags here at Future (*Amstrad Action, Amiga Format, ST Format, 8000 Plus, PC Plus,* and *Classic CD* to name but a few). The sort of features you are asking are more the realm of the document processor or DTP than a simple word processor. Shop around and keep an eye on the pages of Shopping Express but I think you could do a lot worse than to settle for *Protext.*



• **Protext – *an ideal word processor.***

■ HELP! Germany calling

I am at Grimsby College of Technology and Arts, and currently a computer student. One of my core subjects is European

Studies for which I must write a thesis on telecommunications within Germany. I appreciate your time is very precious and would be most grateful for any information you could provide.
Mr. Siu Yee Lo, Grimsby

As a computer student you will be aware of the value of modem communications as a way of gathering information. I wouldn't suggest that you pop the phone bill up by ringing the fatherland but if you scan the Express On-Line lists you should be able to find a local BBS with some sort of echo mail that passes and collects messages to and from Germany. A couple of well placed messages in the net mail boxes could bring you a wealth of first hand information on your chosen subject.

If you haven't access to some sort of communications equipment, you could always leave a message in the reader ads (using the form provided) and hope that one of our benevolent readers can help out.

■ HELP! Typing errors

Having bought an Amstrad PCW8256 about 12 months ago and also at the same time became a regular reader of *8000 Plus* I started to do one or two of its listing programs. Not having success with them, due to my incompetence with my computer or so I thought until I tried the listing in the December issue. Having tried to get it in my computer half a dozen times I finally took it to my nephew only to find he has the same sort of problem, also his chums as well. This convinced me that I was not at fault, but the listing must be.

When I have put all the data in the computer and completed all the instructions, and ready for the final test, which is simply to type prompt, nothing happens. The keyboard freezes, none of the keys function. Other friends have their screen fill from top to bottom with the list of prompts. So could you please help? I would be most obliged.

By the way I have another problem, I bet your saying under your breath, "got a right one here", but please have patience with an old man. The two master disks that come with the Amstrad PCW, both have DIR. I can get them on the screen, but how do you get them to work on individual files? It's the same with say, public domain – I just can't get them to work.
Mr LW Garner, Kings Norton, Birmingham

I asked my colleagues on *8000 Plus* and as well as assuring me that all of the offending programs were in fact faultless, they offered to run them to prove it.

That being the case, I'm afraid that it's your typing (and that of those around you) that is at fault. Go through the listings with a fine tooth-comb and look out for ls where there should be 1s, Os where there should be 0s and other errors of punctuation and letter juxtaposition.

To persuade a program to run, first load CP/M. when you have the a> prompt on the screen, put the disk containing the program that you want to run in Drive A. Type dir and you will get a list of the files on that disk. At the A> prompt, type the name of the file that you wish to run, bearing in mind that it should have an extension of .COM or .SUB (For example PROTEXT.COM or TIMSMITH.SUB).

■ Help! 64 driver

I have recently purchased a Commodore 1351 mouse and OCP *Art Studio* for my Commodore 64. I have a Commodore 1526 printer for which a driver has to be set up for before I can print out pictures. I don't know where to start. The computer asks a series of questions about the printer in order to set up a correct driver. I don't know a lot of the answers needed. I wrote a letter to Commodore asking them for help, they replied twice, but both sets of answers varied slightly and both sets didn't work. Please help! I am desperately in need of these answers as I need to be able to print out hi-res graphics for a CAD project I am doing at school. I have enclosed the print configuration questions and listing (if it helps) and hope someone on this planet can help me
Christopher Warrington, Worksop

I'm as puzzled as you on that one. If the instructions from Commodore don't work and you've tried every possibility and double checked your implementation of the instructions, the only thing left to do is hope that some kind reader of Tech Tips can help you out. In the mean time check out the list of user groups in Express on Line. there could be someone there ready to help you.

■ HELP! Amiga keymap

A plea from a desperate Amiga man – my A500 keyboard is a normal QWERTY keymap but on using shift and the number two for the quote marks it prints @, also using shift and the number three for a pound sign it gives a $ sign.

On phoning the firm which supplied my computer they told me I could change the keymap using the Workbench. After following the instructions given exactly, nothing happened. After numerous phone calls I was told I had the American workbench disk and to send it back to be exchanged for an international Workbench. I did. After more phone calls and a wait of three weeks I got the international disk back. I went through the complete instructions again. Nothing happened. I still have a keyboard which prints in the American style. I have read and reread the manuals in case I may have missed something out, but I cannot see anything. I get the keymap icon up, then scan menu and get info. I then press select button on Add, then select the string symbol, I then print "keymap" gb press return and then select save. I then double click on the keymap icon. Please, please any help or advice would be really appreciated.
John Carr, Salcombe, Devon

In order to make the permanent change to your disk so that it defaults to the UK keymap, you'll have to edit the startup sequence. First copy the Workbench disk and only edit the copy. This way if you make a mistake, you will be able to make another copy to start again.

The instructions on how to copy a disk are in the manual. Startup sequence is a file that you will find in the system directory. Your problems are being caused by a line in the startup sequence with `setmap usa1` in it. The startup sequence should be loaded into a word processor and the offending line edited to change from `setmap usa1` to `setmap gb`. If you haven't got a word processor you can use ED. The instructions for using ED (a very basic text editor) are in the manuals that came with your Amiga. Simply put the yellow cursor over the '1' in usa1 and hit the delete key four times. This will rid you of usa1. Then type gb in its place. Hold down the Control key and hit the X key. This will save your changes and exit from ED. You can now reset the Amiga (with the key sequence Control-Amiga-Amiga) and you should have the GB keymap. ■

■ HELP! Amiga display

I have owned an Amiga A500 now for three years and I was hoping that you could help me with a number of problems.
1) Is it possible to connect a PC VGA monitor to an Amiga without extra circuitry? If so could you please show me how and what I would need. It would not be the first time I have made up leads for the Amiga, ie modem leads.
2) If so does the VGA hold any improvements over the Commodore 1084S or the Philips 8833 range of monitors and if so in what ways?
3) Is it possible to connect a PC hard disk to the Amiga. I have a 32 meg hard disk and would like to fit it up to my Amiga instead of forking out over £300 for the Commodore model. If it is possible please show me how.

I would be most grateful if you could help me. I have searched high and low for answers to these questions.

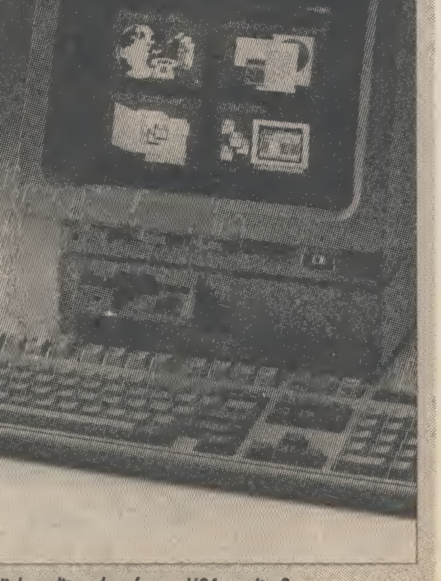
I have bought NCE from issue one and rate it as the best mag for up-to-date news.
Paul Trouton, Co. Armagh.

It's possible to connect some kinds of VGA monitors to an A500 but it isn't necessarily easy. The sync rate of a an Amiga is 15.625KHz wheras many VGA monitors have a sync rate of double that. The only easy way to do the job is if you have a multi-sync VGA monitor that has the ability to run at the Amiga's sync rate unmodified.

With a multi-sync VGA monitor it should be a simple matter of making a lead. The pin connections for the Amiga 23 way video output is in the user manual and similar information about the VGA monitor should be either in the monitor's manual or available from your supplier.

Using a VGA monitor with an A500 wouldn't really offer you any great advantage over a Philips or Commodore model unless you upgraded to the top level A3000. PC hard drives can be fitted to Amigas, but it isn't an easy job. As well as an in-depth knowledge of hard disks, controllers and SCSI interfaces there could be an extensive hardware modification too. If you can't figure out how to do it on your own, the job's not for you.

The only light at the end of the tunnel comes from a device called Megastor. This is a PC hard drive designed to connect to a PC via the parallel port. Experiments are currently underway to see if it is possible to persuade it to work with a PC under hardware emulation. (ATonce or KCS Power PC Board). Should this be successful it may offer an alternative route to an Amiga hard drive. Watch Circuit City for details.



• *High quality colour from a VGA monitor?*

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TRAINING FOR YOUR FUTURE

RECURSION REVISITED

Mary Branscombe takes you beyond the statement 'recursion: see recursion' and explains the functions of this complicated technique.

Recursion is usually looked on as an advanced and complicated technique reserved for esoteric problems in Artificial Intelligence – too confusing and irrelevant to the ordinary programmer. Most of this attitude probably stems from the ludicrous definitions often given to the technique; anyone faced with the statement "recursion: see recursion" could reasonably assume that an important tool would not seem so pointless. The other argument against recursion is that it is inefficient.

Recursion is a technique where a function can call a copy of its own code to solve part of the problem that it is working on. If you want to calculate the factorial of a number, you calculate the factorial of the number immediately before, working backwards until you find the base case or termination condition – a number whose factorial you already know. As each calculation follows the same formula, you can use the same code for each number, and then combine the results for the total.

A well-written iterative loop may incur less of an overhead than the embedded calls generated by a recursive function; this is assuming that the loop is well written and that there are no time-wasting mistakes to be repeated each time around the loop. The main advantage of recursive functions is that they are easy to write and understand, and this makes them easy to maintain. For all but the smallest section of code, this is a major consideration and may outweigh questions of efficiency, unless you are really short of memory. Also, recursive functions create their own arguments and variables for each new call, since a new copy of the code is used, so recursion does its own book-keeping.

Anything that you can do using recursion, you can do using iteration, but some things are easier when written recursively. If you consider a simple loop, written as:

```
loop: DO
      instruction1
      instruction2
      ...
      LOOP
```

then you can write this recursively as follows – List is a label given to the list of instructions:

```
List: instruction1
      instruction2
    ...
CALL List
```

The DO loop will be implemented by a jump to the beginning of the loop each time the keyword LOOP is reached – this code actually produces an infinite loop. When the List function is called, control does not jump back to the beginning of the definition of List; instead, a new copy of the code that makes up List is copied to the current program area, so that any variables created within the first instance of List will be created again, in the second copy. This means that all the variables are local; if you want to use a control variable, to keep a tally within the recursion, you will have to pass it from copy to copy as a parameter. If you are using recursion to calculate a final value, you must pass in a parameter to hold the value; this argument will be passed down through the copies until the value is calculated and then passed back up as the recursion 'unwinds'. This means that, like any repeated code, you must include a termination condition – something to tell the program when to stop. This is known as the base case. For each function, you will also need the general recursive case – what the function does every time except the last one – and definitions to cover any special cases – if the input data is out of range, for example.

- Recursion works by calling duplicate copies of the original routine.
- Parameters must be used to pass data in and out, and results must be carried up from the lowest level of recursion.
- If code comes after the recursive call, it will be executed in the last copy of the function first.
- Recursion is best for repetitive problems that can be solved in stages.

Recursion can be used in most languages; in Prolog and Scheme (Jerry Sussman's version of Lisp), it is the main method of repeating code. Recursion is best used where a problem can be solved by breaking it down into smaller sub-problems. It is excellent for handling hierarchical data, for example that stored in trees. As each point in a tree is either a terminal node or the beginning of another tree, the tree is actually defined by recursion and so recursion is the most natural method for searching through the structure.

SOLVING FACTORIALS

The factorial of a number is the product of all the preceding numbers. The factorial of four, written 4!, is 4x3x2x1, or 24. The factorial of one is one. To calculate this using a recursive function, the algorithm would be:

```
if n<>1 then
    n! = nx(n-1)!
    else n! = 1
```

and the code would look something like this:

```
factorial(n, result)
    m=n-1
    IF n<>1 THEN CALL factorial(m, result)
                      ELSE result = 1
    result = resultxn
    RETURN
```

The number to be factorialised in input in n; if this is one, the function returns one without making any calculations. Otherwise, n is decreased by one to give a value for m and another copy of the code is called to calculate the factorial of this number. If m contains the value one, this copy will return one in result, otherwise it will decrease the value of m again and pass this to another copy of the code. This process continues until m is equal to one; obviously, this does not work for negative numbers. When a copy of the function returns one as the value of result, this is multiplied by the value in n in the copy immediately before the final copy. This calculated value is then returned to the copy before that and multiplied by the value of n stored there, until the original code is reached and the final value calculated.

If the original number is three this will be decreased to two in the first instance of factorial; two is not equal to one and so a copy of factorial is called. The value passed in is two, which is decreased to one, which is multiplied by two, giving two; this result is returned to the previous instance of the code and multiplied by three, to give the final result, six. When implementing this algorithm, you will need to reject negative numbers – as they can't be decreased to one, the recursion will carry on until the machine runs out of memory. You will not be able to calculate the factorial of numbers larger than 15 because the result will be a larger number than the computer can handle, you should check for this in your code. The program looks like this in C:

```
/*comments
 *recfact.c
 *calculate factorials recursively
*/
#include ,stdio.h>
#include ,stlib.h>
#define NDIGITS 10
long factorial(short);
int
main(void)
{
    char input[NDIGITS + 1];
    /*buffer for input*/
    short number;/*initial number*/
    long result;/*resulting factorial*/
    /*get input from the user*/
    printf("Type a non-negative integer
    and press return");
    gets(input);
    number = (short) atoi(input);
    /*calculate and print the factorial*/
    result = factorial(number);
    printf("The factorial of %hd is %ld\n",
    number, result);
    return EXIT_SUCCESS;
}
long
factorial(short n)
/*recursive factorial calculation)
{
    if (n <= 1)
          return 1L;
    else
          return (n*factorial(n-1));
}
```

The main() function sets up a character array as a buffer and gets the input from the user. This will be given as a character, so atoi is a library function used to convert it into a number. The value of this is stored in number and passed to factorial. If the argument is less than or equal to one, one is returned – 1L indicates that this is a long integer. The return type has been set as a long integer to handle the large numbers generated as factorials and all results must be in this form. If the argument is greater that one, factorial calls itself with an argument of one less than the argument it received, and so on until the argument is reduced to one. When this happens, all the functions return one after the other, returning the final value to main().

This code does not reject numbers above 12; try modifying it to do so. If you do not program in C, try the algorithm in a language you do use. Remember there must be a point at which the recursion bottoms out. ■

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THE PD COLUMN

MC Adam 'Bad' Waring gives you the low down on sampling and rapping on your ST, some crucial clip art for the Amiga and a pair of well wicked games.

STE Soundtracker • STE • The Demo Club

STE owners know that they have a technically far superior machine to its ancestor the ST, especially as regards its sound capabilities. And yet little has ever been written specifically for the machine.

The *STE Soundtracker* goes one step towards changing all that. It allows you to play those samples in glorious stereo that previously have been only available to Amiga owners. The quality of the music is truly astounding, and what's more, a total of thirty music disks translated across from the Amiga are being prepared.

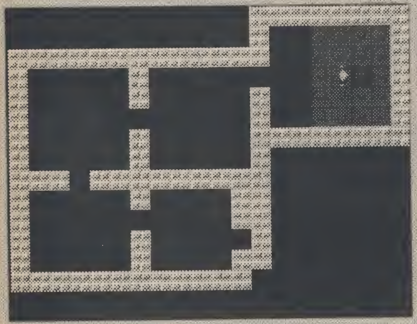
So if you have an STE, and feel like giving it, and yourself, a treat, then this may just be the program for which you've been looking.

Rrap • ST • Trust PD • DEM124

Fancy yourself as a bit of a DJ but you don't want to swap your computer for a twin deck? Then you can cut into the groove with *Rrap*, the do-it-yourself rapping kit for the ST.

In essence it plays back preprogrammed samples. The fun bit is that by simply pressing a key a sample replays itself rapidly and repeatedly thus forming the basis of a backing track. There are a number of samples built in, mainly taken from digitised speech samples from demos, and short, repetitive tunes. These are selected with the mouse so you can quite quickly become a proficient rapmaster just by pointing and clicking.

And that's just about all there is to it! A fairly useless piece of software actu-



• *Soko shuffles onto your ST with the classic.*

Soko ST • ST • Trust PD • GAM44

An old favourite makes it onto the ST. You play a factory worker whose task is to shift stacks of boxes through a warehouse. You do this by pushing them along the floor then placing them in predetermined spaces. It's been written in STOS, Mandarin's supercharged games Basic package to which so many PD programmers seem to be turning.

Problems arise because you can only push, not pull, the crates. Should you push one into a corner, or get it stuck in some other position, then it's impossible to get the thing out again. The factory layouts are constructed in such a way that it's very easy to find yourself in a jam.

There are 50 levels to the game, and even the first is tricky, but not too hard, to solve. Your little bloke struts around with well-defined little steps. In fact the whole game, if not a graphical masterpiece, is very pretty throughout.

But despite having an arcade-style look the game definitely tests the mind more than the reflexes. Time and time again you find that you've made a mistake, usually when it's a tad too late to do anything about it. Once you accustom your thinking to the 'laws' of the game, though, you can spot the possible problems in advance. Be warned though. Once you start on a puzzle you may find it impossible to stop until it's finished!

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ally, but it should provide a brief distraction when you're stuck twiddling your thumbs.

AMOS Paint • Amiga • Amiganuts • Disk 911

You too could be well on the way to becoming a world-famous artist with the help of *AMOS Paint*, a PD art package for the Amiga.

With *AMOS Paint* you will be able to draw pretty pictures on your screen with the aid of your mouse, and, of course, a dash of hand-eye co-ordination.

The utility offers many tools for would-be Van Goghs. You can draw lines, boxes and circles. In fact many of the tools you might find on a full priced art package are available on this program for next to nothing.

The painting environment is very simple to use. Should you want to add a dash of colour underneath the area covered by the icon bar, it obligingly moves out of the way. One thing it doesn't provide are guaranteed results. All my pictures were rubbish. Oh well, practice makes perfect.

It works best on a machine with at least one megabyte of memory. A500 owners can use the package as well but will have to sacrifice the undo function. As a result mistakes can't easily be rectified, which, if your artistic abilities are anything like mine, is a function which will be sorely missed. ■

1 Across 2 Down • Amiga • Amiganuts • Disk 877

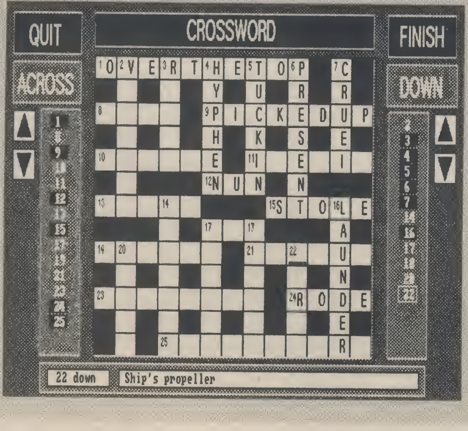
1 Across 2 Down is, you might not be surprised to learn, a crossword program for the Amiga which lets you solve the puzzles on screen.

The main display is a large crossword grid. You can scan through the across and down clues easily with the mouse. The clue is displayed on a line at the bottom of the screen. When you think you have the answer, just tap it in and it appears as if you'd filled it in with a biro.

Two disks are used: a program disk which has the actual crossword software, and a data disk that holds the puzzles. There are eight brain-teasers supplied on the initial disk, and further disks are promised to be released just as soon as they've been compiled.

So, how difficult are the puzzles? Well, I'm just about capable of solving the quick crossword in our local freebie (as long as it has the answers on the last page) and I found the questions in puzzle one fairly straightforward. Then again, subsequent releases could prove to be more of a challenge.

At any rate, *1 Across 2 Down* provides a high tech way of spending your tea break without first having to nip round to the corner shop to get yourself a newspaper.



• Tea break satndard crosswords on the Amiga in 1Across 2 Down.

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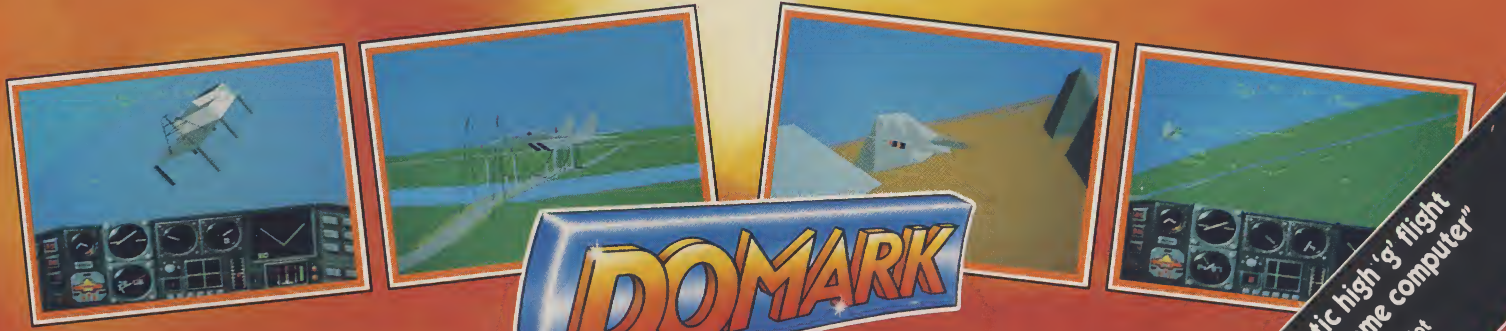

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GAMES WEEK

Neil Jackson gives you the low-down on the latest new games, playing tips, cheats and news.

• *Beastbusters: blood and guts, guts and guns, and more guts.*

PREVIEWS

News of Activision's demise is still proving to be a little premature. It seems that the ailing American giant has several products waiting in the wings for release over the next couple of months. And what's more they're all either designed or programmed in Britain!

Hunter is a radical game which the company has done pretty well to keep under wraps for so long. It features some amazing filled vector graphics and more gameplay than you can shake a very large and powerful stick at.

You're a soldier, working for "Our Side" and you have many missions to fulfil. Depending on the style of game you choose, you may have one long mission that takes you all over the world and lasting several hours, or one of a bunch of shorter missions which have a more racey action feel.

All missions involve the use of a number of special items to help you in your quest. Strewn all around the world you find cars, trucks, ambulances, bicycles, hovercrafts, helicopters and boats waiting to take you away. Vector rabbits and ducks wander about the landscape, waiting to be caught and eaten, and villages contain all kinds of dwellings, usually with goodies inside.

While roaming around you meet other soldiers, nurses and civilians, some enemy, some friendly and some equally rude to both sides. An enemy uniform comes in handy for some low-grade espionage and the gun is even handier when you've been sussed! Activision is currently looking at a March release date for this tasty looking Amiga and ST treat.

Activision is also ready to announce the release date for *Beastbusters*, an SNK arcade conversion featuring all kinds of blood bespattered zombie nonsense. In an *Operation Wolf*-style, *Beastbusters* puts you head to head with all sorts of rotting nasties that splurge and disembowel in true Cronenberg fashion. Look out (through your fingers) for this during April.

Also lurking in Activision's new Reading HQ, you'll find *Deuteros*, the long-awaited sequel to *Millennium 2.2*. *Deuteros* is set a thousand years after the completion of its predecessor, somewhere around the year 3300 AD.

At this time, the once-strong empire of solar system colonies has collapsed. Old alliances have faded into obscurity, colonies have all declared independence and the moonbase has been forgotten since the Earth was terraformed. Legends and myths recall those historic times, but nobody is sure whether it's fact or fiction. ➤

PLAYING TIPS

CONSOLE ZONE

NEC PC ENGINE
Don't do anything in the *Galaga* bonus round for an even better bonus score and a cute little alien dance!

SEGA MASTER SYSTEM
The white stone in *Ultima iV* is located in the mountains of Serpents Spine.

NINTENDO GAMEBOY
Thanks to Dominic Brookman from Kenilworth in Warwickshire for these *Golf* tips. Novices should start on the Japanese course as it has far fewer trees and hazards. Practice the back spin and the super shot as they could lead to birdies. When in the rough use the pitching wedge for the best possible shot. Pay attention to wind levels especially when you are on the greens. Aim for birdies and eagles; and you're get treated to a spectacle of yourself jumping about with delight.

SEGA MEGADRIVE
The passcode for the final HERZOG ZWEI round is JLJOIGLAOKN

ATARI LYNX
Thanks to Nicholas Wells from Norfolk for this *Gates of Zendacon* tip. Enter TRYX as a code. As soon as your ship appears, go down and right to go straight through the platform. Dodge the walls and go in the first gate. You will be on a secret level.

NINTENDO ENTERTAINMENT SYSTEM
Enter this *Metroid* password to change Samus into a woman: JUSTIN BAILEY

GAMES REVIEW

SPEEDBALL 2

Atari ST and Amiga • £24.99

Will you balls up?

After two years waiting, the illustrious Bitmap Brothers (of *Xenon* fame) have released the sequel to their smash hit *Speedball*. The name of this offering? *Speedball*, er, *2*. Not such a good start really, but never mind.

The game, like its predecessor, is based on a futuristic sport, pumped to the hilt with violence, aggression, excitement and action – all the things you really need for another smash hit. It's a team game, with two hordes battling over control of a large metal sphere (called, er, a ball) and attempting to place it into a large open-ended hole (called, er, a goal) at either end of the flat, metal-panelled floop (called, er, a pitch).

Each game consists of two halves of 90 seconds during which you control one team. The other team can be controlled by the computer or by another person, depending on your social standing, personal odour, etc. The ball is fired from a machine which pops up from the floor and then, basically, all hell breaks loose. There are no foul rules, out-of-play rules or many rules at all really. In fact you actually get extra points for disabling the opposition members!

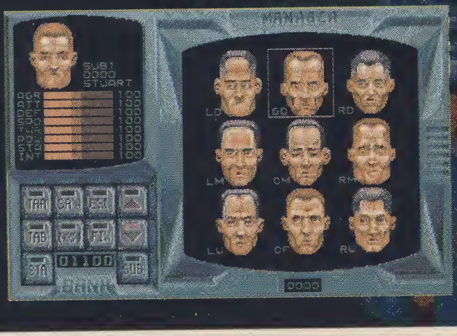
When a player has the ball, a large letter appears above his head, telling you whether he's a midfielder, attacker or a defender, and depending on his abilities whether you need to tackle him or just smack him in the gob. You control the method, and hopefully the remaining members of your team will back you up. Occasionally they just nip off somewhere else for a quick scrap, leaving you to fend for yourself.

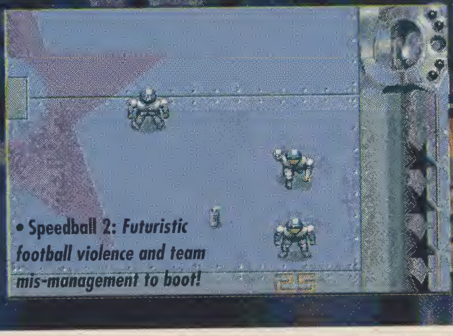
All around the outside wall of the pitch are special icons, which include warp-gates (for transporting the ball downfield), score-multipliers and electro-bouncers (for making the ball unstoppable). You'll also find money and a variety of power-ups appearing on the pitch itself.

Speedball 2 can be played in a number of different game-formats – knockout, league, cup and exhibition matches. The first three types involve management too, which forces you to build up your team's abilities over a period of time. You can train your players and give them extra speed, stamina and intelligence, providing you win the required points from each game.

Speedball 2, while being a sequel, is still a fantastic game. Sound effects are superb, with all manner of cyber-punky crashes, smashes and "oofs" emanating from your monitor. Graphically, it is again superior. The images are stunningly well drawn, with perfect highlights and "chrome-look". And the game is fast. Very fast! So fast that sometimes you'll need to use the extra Replay option to see what really happened.

If you missed *Speedball 1*, don't make the same mistake with *Speedball 2* – it's too good to overlook. If you've got *Speedball 1*, then the incredible amount of extras in *Speedball 2* practically makes it a different game. Go on, you still want it really!





• *Speedball 2: Futuristic football violence and team mis-management to boot!*

★ POCKET SIZED ★ PC-COMPATIBLE ★ PERSONAL ORGANISER ★

ATARI Portfolio

THE PC IN YOUR POCKET

The new Portfolio from Atari is the world's first pocket-sized electronic organiser that is also a powerful PC compatible computer, with a full QWERTY keyboard and scrolling 80×25 character display.

Portfolio includes everything you would expect from an electronic organiser - an address and telephone book, time manager, diary and sophisticated calculator.

Portfolio also includes several functions that you would not expect - a spreadsheet for your personal budget and expense records, as well as a text processor for typing memos and letters.

And, because Atari's Portfolio is PC compatible, it can communicate with your desktop PC at home, or in the office. You can transfer files from one to the other, to enable you to update your reports and figures with the Portfolio while you are on the move.

FOR ONLY **£199** INC VAT

SPECIFICATION

- ***Processor:*** Intel 80C88 at 4.9152Mhz.
- ***Operating System:*** Compatible with MS-DOS 2.11.
- ***Internal ROM:*** 256K containing BIOS, operating system and applications suite.
- ***RAM:*** 128K with an internal RAM disk, configurable from 8K. Externally expandable to 640K RAM.
- ***Keyboard:*** 63 keys, QWERTY, IBM PC BIOS compatible. Buried numeric pad and function keys. Optional key click.
- ***Character Set:*** Extended IBM ASCII (255 characters).
- ***Mass storage:*** credit card sized memory cards (32K or 64K or 128K RAM).
- ***Display:*** Graphics LCD, supertwist technology, MDA compatible, 40 columns x 8 lines, 240 x 64 pixels (with the option to window a full 80 x 25 character display). Keyboard controlled contrast.
- ***Peripherals:*** 60 pin expansion BUS to take serial and parallel ports and memory expansion units.
- ***Size:*** 8″ x 4″ x 1″ (200mm x 105mm x 29mm).
- ***Weight:*** 495 grammes (with batteries).
- ***Applications:*** calendar and diary, address and phone book, Lotus 1-2-3 compatible spreadsheet, text processor, communications software.

COMING SOON!

In addition to the excellent software built-in to the Portfolio Free of Charge (see right), other software and peripheral products, such as the sophisticated Pocket Finance package and serial/centronics interfaces are available. And it doesn't stop there. Many manufacturers have recognised the potential of the Portfolio and have already started to design new peripherals and software. Products currently under development include: Serial interface with built in mini modem, Apple Macintosh interface, business, utility and programming software plus a range of adventure and battle strategy games. For further free details on the Portfolio range, fill in the coupon below and return it to Silica Systems now.

5 BUILT-IN APPLICATIONS TO GET YOU ORGANISED!

To get you started, Portfolio comes with a suite of five useful functions built-in, all accessible from a simple menu display.

TIME MANAGER

More than just an electronic diary, the Portfolio Time Manager enables you to plan your appointments via a comprehensive calendar and diary. It can even be programmed to sound an audible alarm at specific times to remind you of important appointments.

CALCULATOR

Your Portfolio will be invaluable in the office or at home as a powerful pocket calculator. It has a full range of functions, including factorial, power and root calculations, all with multi display formats and memories.

ADDRESS BOOK & DIALLER

Portfolio has a complete address book facility that allows you to store hundreds of addresses and phone numbers. And, at the touch of a button, you can retrieve any one of them, or search for a specific grouping, such as "all Italian restaurants". And, when you are ready to book your table, hold your Portfolio to your telephone mouthpiece and use its special built-in tone dialler to dial the number for you.

TEXT PROCESSOR

The Portfolio's built-in text processor program includes word wrap, line and column count, string search, in fact most of the functions you would find in a word processor. It handles printer and word processor control codes and allows easy transfer of files between Portfolio and your desktop PC.

SPREADSHEET

For real calculating power, Portfolio has a Lotus 1-2-3 compatible spreadsheet built-in. It has 127 columns x 225 rows and reads/writes Lotus V1.0 and V2.01 files, so you can transfer data to and from Lotus 1-2-3 on your desktop PC. The Portfolio's 256K ROM includes MS-DOS and PC BIOS compatible systems software.

MEMORY CARDS

Portfolio can store and retrieve data and programs from its own RAM, or from small credit card size memory cards, that slot into its built-in card drive. The cards are available in three sizes, 32K, 64K and 128K, so you can carry a library of data in your pocket. The card drive also accepts ROM cards, which can contain commercial or custom software.

POWER SUPPLY

Portfolio is powered by three AA batteries which will run for up to six weeks with normal use, or from the mains using an adaptor. All the peripherals take their power from the Portfolio, so no extra batteries or adaptors are required. A 'battery-low' warning and memory back-up ensure that information is not lost when the batteries are changed.

INTERFACES & PERIPHERALS

Portfolio can communicate with other computers and supports a growing range of peripherals via a built-in 60 pin bus connector. Peripherals available include serial and parallel interfaces and memory expanders (to 640K). You can also add a card drive to your desktop PC, to enable it to read/write to Portfolio's cards.

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CREDIT PAYMENT TERMS: Silica are licensed credit brokers - details on request.

Before you decide when to buy your new Atari Portfolio, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after buying your Portfolio, when you may require additional peripherals or software, or help and advice with your new purchase. And, will the company you buy from contact you with details of new Portfolio products? At Silica Systems, we ensure that you will have nothing to worry about. Silica Systems is a new division of Silica Shop, the UK's leading Atari specialists. This new division has been established to provide a service to the more serious home user, as well as to business and education purchasers. Silica have been established for over 12 years, and have an annual turnover of £13 million. With our unrivalled experience and expertise, we can now claim to meet our customers requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now, for our latest Free literature and begin to experience the "Silica Systems Service".

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Which computer(s), if any, do you own? ....

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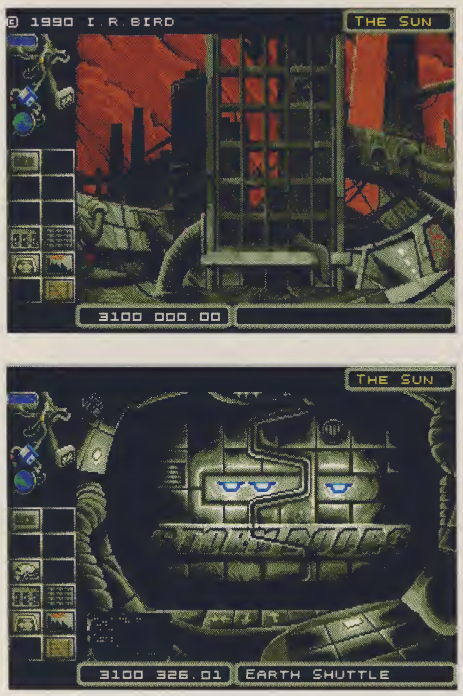


• **Deuteros:** *(top) A thousand years after* **Milennium 2.2** *and the Earth's wrecked again. (Bottom) Spread your influence throughout the galaxy and re-establish your former status.*

Your job is to investigate, first by locating the old moonbase (to prove that it exists) and then exploring the rest of the solar system to find any remaining colonies.

Deuteros is a vast game, much larger than its predecessor. In it you'll discover all kinds of weird and wonderful devices, ships and shuttles. The command-issuing system is a much-refined version of *Millennium*'s, but it grows in its abilities as you progress through the game. Just as certain tasks become repetitive, you'll discover something to make it a whole lot easier. And as you'd expect, you'll be getting all kinds of heat from someone, somewhere, who has a score to settle. *Deuteros* is due out for Amiga and ST at the end of March.

Finally, the sequel for *R-Type*, cunningly called *R-Type 2*, is also due from the company sometime early this year. The word is that it will be released just as soon as ARC, the development team working on the game, has finished the code and the product has been tested. More news when we get it. ■

TOP 10 SIXTEEN-BIT GAMES

THIS WEEK	LAST WEEK	CHART WEEK	TITLE	PUBLISHER	MACHINE
1	NE	1	*Final Whistle*	Anco	AG
2	1	7	*Powermonger*	Electronic Arts	ST AG
3	5	20	*F-19 Stealth Fighter*	Microprose	ST AG PC
4	6	12	*Lotus Turbo Challenge*	Gremlin Graphics	ST AG
5	4	8	*Teenage Mutant Hero Turtles*	Mirrorsoft	ST AG PC
6	16	6	*ESWAT (SG)*	SEGA	OT
7	2	20	*Kick Off 2*	Anco	ST AG PC
8	3	8	*Robocop 2*	Ocean	ST AG
9	NE	1	*BAT*	Ubisoft	ST AG
10	NE	1	*Chaos Strikes Back*	Mirrorsoft	ST AG

For the week ending 19th January 1991
ST – Atari ST AG – Commodore Amiga PC – IBM PC or compatible OT – Other
Chart compiled by Gallup. © European Leisure Software Publishers Association.

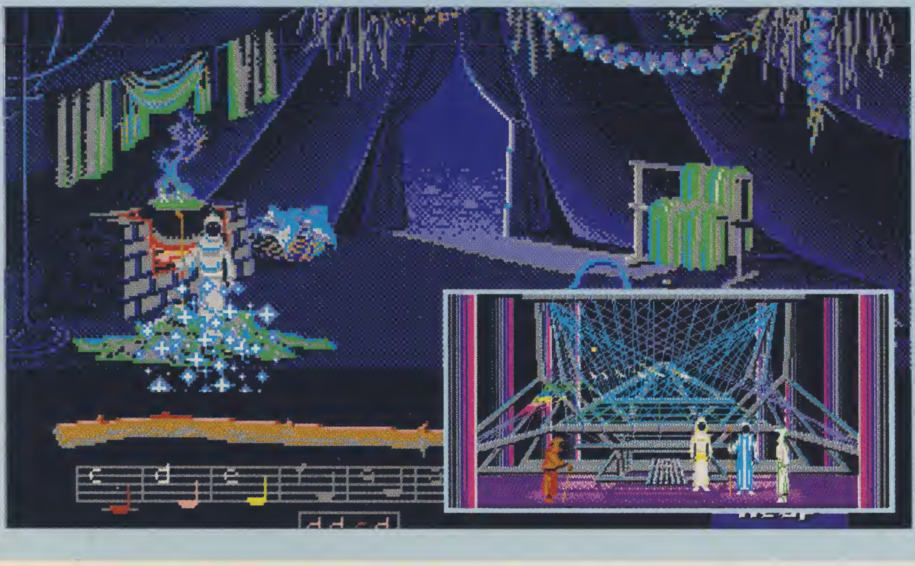
LOOM

Amiga, ST and PC

The hidden fruits of the loom

Here's a few weird things to try if you're getting bored or stuck in Lucasfilm's *Loom*, or if you've completed it and didn't know there was more to do!

- Leave the egg-chamber without opening the egg.
- Spin Open and Close on the clam at the dock. (You could also wait until you can play the "F", lead the gulls out to sea, then return and play with the clam.)
- Spin Dyeing and Bleach Green on the tapestries in the Sanctuary.
- Spin Night Vision on the sky above the cliff top.
- Look at Cygna's gravestone, Open the sky from the cliff top, then go back and look at the gravestone again.
- Open any of the graves (before Mandible does, of course).
- Try to Fill the graves.
- Close the owl holes.
- Try to sail /itals>past/ the waterspout to the mainland.
- Open and Close the chalice.
- Fill the chalice before double-clicking on it to summon Master Goodmold.
- Read the grave-markers in the dome, after you've talked to Master Goodmold about the goblet.
- Spin Terror on the workers in the Scythe Room while Bobbin is invisible.
- Reverse the Invisibility Draft on the workers while in the Scythe Room.
- Dye the dozing shepherd's sheep green, then wake him up.
- Dye the lamb in the manger.
- Leave the hut without looking at the lamb.
- Try Terror on the lamb (you rotten swine you!).
- Look at the dragon.
- Look at the dragon's gold.
- Spin Terror on the dragon before turning the gold to straw.
- Open and Close the pool in the caverns.
- Each of the three Spheres shows three scenes; did you find them all?
- Did you find the Sphere in the Caverns? Empty the pool.
- Sneak into the forge as Bobbin, over and over again.
- Spin Wake on Rusty again.
- Go in and out of the Forge gate, while disguised as Rusty.
- Change the straw in the Forge cell to gold.
- Fill and Empty the wood bin.
- Twist the sword Edgewise is making instead of blunting it.
- Try to leave the Forge graveyard without healing Rusty.
- Spin reflection on Rusty's corpse.
- Dye the dead sheep and the shepherds green.
- Spin Terror on the dead and dying shepherds.
- Try to heal Master Goodmold.
- Heal the holes instead of Closing them.
- Try to spin as draft on Chaos.



And here's a list of Drafts and where they're located:

DRAFT	WHERE FOUND
Transcendenc	Any of the Spheres
Opening	Loom Chamber (from the egg)
Night Vision	Woods (from the owls)
Straw into Gold	Dark Tent (from the spinning wheel)
Dyeing	Dye Tent (from the dye pot)
Emptying	Dye Tent (from the flask)
Twisting	At Sea (from the waterspout)
Invisibility	Mainland Forest (from the sentries)
Sharpening	Crystalgard (from the scythe)
Terror	Crystalgard (from the Sphere)
Sleep	Meadow Fence (from the sheep)
Healing	Shepherd's Hut (from Fleece)
Reflection	Cavern under Dragon's Mountain (from the pool)
Silence	Loom Chamber (from Chaos, via Loom)
Shaping	Loom Chamber (from Chaos, via Loom)
Unmaking	Loom Chamber (from Chaos, via Loom)

MUSICAL GREATS

MAKING THE MOST

The ST is absolutely unbeatable in terms of music. Mark Higham looks at why no other home micro has been met with such enthusiasm from the music world and reviews some of the best sound programs.

The ST's impressive reputation in the music world is almost entirely attributable to the fact that the ST came with built-in MIDI ports as standard. Musicians have been exploiting the enormous potential of the ST's MIDI ports from the earliest days, and because of this you can lay your hands on music software which costs as little as £2.50 or as much as £500, depending on the size of your wallet and your passion for music.

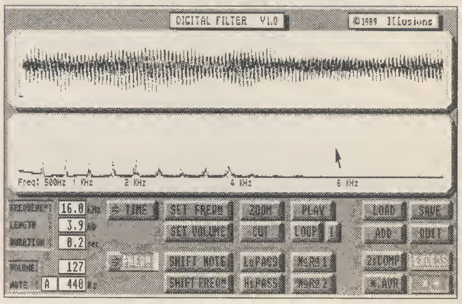
ST manufacturer, Atari, revelled in all this attention and at the end of '89 it released a portable version of the ST – the Stacy – armed with MIDI ports and hard drive. Now you can even take an ST onto the stage and use it to pull in those crowds.

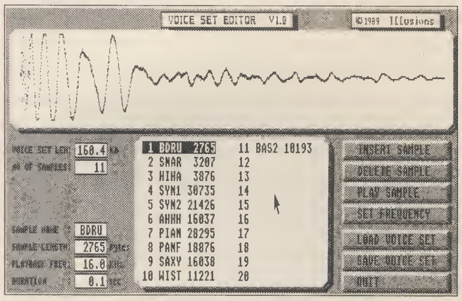
MIDI is a serial link similar to RS-232. It transfers data from one MIDI device to another in digital 'packets'. Connections are made through 5-pin DIN sockets and on most MIDI devices you'll find a MIDI OUT, which transmits signals, MIDI IN, which receives them, and sometimes a MIDI THRU, which passes signals through the instrument to other devices. In the ST, MIDI THRU is hidden on two spare pins of the MIDI OUT socket.

The ST music scene isn't limited to MIDI. In fact, you can create a wealth of tunes without ever plugging anything into those innocuous ports on the side of your machine. One option is to program the ST's internal sound chip. While the sound quality isn't particularly impressive, it does provide a useful step into the heady world of music.

QUARTET

ALL STS • MICRODEAL • £49.95





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 1 BDRU  2765    11 BAS2 10193
 2 SNAR  3207    12
 3 HIHA  3876    13
 4 SYN1 30735    14
 5 SYN2 21426    15
 6 AHHH 16037    16
 7 PIAN 28295    17
 8 PANF 18876    18
 9 SAXY 16038    19
10 WIST 11221    20
```

What do you do with a digitised sound once you've got it into memory? Play it back several times, reverse it, squash it, move sections. Then what? Microdeal has come up with the answer – a composing tool which uses sampled sounds as the instruments. What's really astonishing, though, is that it's possible to have four channels of sequenced sampled sound playing simultaneously.

Up to 20 instruments can sit in memory, and each note can have any of the memory-resident samples assigned to it. Complete sets of instruments can be loaded and there are over 100 individual ones provided.

Quartet provides two MIDI modes: Poly Play and Record. In either mode it's possible to alter the current sample by pressing the instrument-select keys on you synthesiser. Poly Play takes the sample selected in *Quartet* and enables you to play your instrument using up to four channels. The Record mode is arguably more useful, since it enables you to play your MIDI instrument and have the notes automatically appear in *Quartet*'s active stave.

Because of the way *Quartet* works, compositions lasting several minutes take up very little memory. A typical song might take up 3K. The sampled data might add another 32K and the replaying routines a further 16K. That's little more than 50K for a hit composition.

Quartet is amazing. Play around with it and you just won't believe the sound you hear coming out of your ST. You don't need a sound sampler to use the program as there are so many instruments provided. If you're an enthusiast interested in making music, *Quartet* is the package to beat all others.

MUSICAL

ALL STs • £39.95 • EVENLODE SOUNDWORKS • 0993 898484

If you're a beginner looking to compose and eventually perform music of a high calibre, *MusiCAL* has been designed for you. It's a set of five programs that lead you through the principles of music.

Unit One is a simple composing program that uses an external MIDI keyboard. The idea is that you make up little short patterns of music in four on-screen boxes.

Unit Two uses the internal voices instead of MIDI and is a great way of showing the physical shape of sounds and soundwaves. You have five preset sound shapes and when a note is played, you get to hear it while the waveform frequency fills in the sound shape.

Unit Three tests your ear by giving you notes and asking you to tune another note to it. The note is altered by a large slider, but you don't hear the note change as you adjust it.

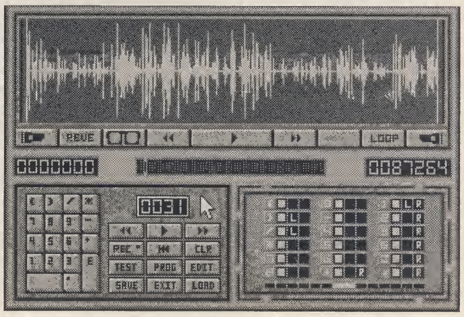
Unit Four is a simple composing program that uses what is technically known as a pentatonic scale – five notes arranged in the same order as the black notes on a keyboard.

Unit Five involves percussion only. You write in drum patterns using three lines of music – one for each instrument.

MusiCAL, and particularly the accompanying text, is a well thought out package. It would have been an advantage to make all the units work without the aid of MIDI instruments, something that is not too hard to do, because it would free up one more MIDI instrument for the classroom if necessary. There's no doubt that at this price it's a bargain and it could even suit mature pupils who wanted to start on a computer assisted music primer course

MASTERSOUND

KEMPSTON DATA • £34.95



This comes from the programmer who created *Prosound* and the whole environment bears more than just a passing resemblance to its predecessor.

Mono input is taken from a cassette player and fed into the cartridge. Once the sample has been grabbed it appears in the display window as a wave pattern with peaks and troughs representing the volume.

The sample can be subjected to all sorts of punishment using the icons and shifting pointers. A useful feature not present in *Prosound* is the ability to fade the sample in and out and also to make volume increases in selected areas. With options to zoom in on areas of the sample, you can ensure that editing is as precise as you need. The sequencer is the best side of the package, allowing you to load up to 18 samples and then play them back in a pattern. This works by enabling you to assign sections of the sample to the 18 keys on the keypad and then programming them to be replayed in order.

With the samples compatible with most others on the market, it's simple enough to progress onto more expensive packages at a later date or even to follow the current trend in stealing tracks from games. However, the sequencer is not compatible elsewhere.

Master Sound is a tool for playing with music rather than designing professional sounds. The environment is simple to get used to and surprisingly effective results can be obtained in no time at all. This is one of the best samplers around, offering the kind of quality to match more expensive models.■

Mark Higham is editor of ST Format *magazine. These articles are reprinted from his book,* Get the most out of your ST, *available from Future Publishing Ltd, The Old Barn, Somerton TA11 7BR. Price £9.95.*

HARD FAX

With fax machines came yet another means of communicating information – and not just in words. Keith Pomfret looks at what these machines have to offer and which type is best for you.

• *British Telecom's CF500 facsimile can act as the hub machine in a fax network.*

Faxes have been with us for nearly a quarter of a century. A small fax terminal can sit on one corner of your desk or even in a slot in your PC and give you the ability to transmit complicated documents anywhere in the world instantaneously. It wasn't like that when the first of these machines appeared though.

The first facsimile (fax) machines were large noisy mechanical monoliths that languished in baths of noxious chemicals and produced a smell not dissimilar to a linoleum factory. These huge document processing engines were prone to breakdown and the quality of their output was questionable to say the least.

At the beginning, the fax was the domain of the multinational corporation, the broker and the public utility. Ideally the first generation of fax would live in a room on its own, preferably as far away from civilisation as possible. The size, noise and smell meant that the fax wasn't a user-friendly office trained instrument. At the time it had the mail, Telex and telegrams to contend with and was the last option when a document had to be sent in a way that guaranteed it would be received immediately.

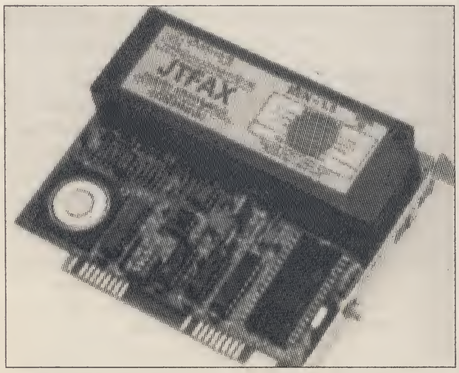
Faxes use the same phone lines as voice communication and so can be routed to any one of the billion or so phone lines in the world. As long as there's a fax machine on the line at the other end, a document can be sent as simply as dialing a number and chatting.

Unlike computers, there is generally one set of protocols for fax. If there's a fax machine at the other end of the phone line that supports the same group of data transmission as yours, you're in business. While the computer world still flounders around with over a dozen environments and operating systems, fax offers one system divided into four well documented groups.

A stand-alone fax machine is a combination of several things. In order to transmit an image down the phone lines, it needs to be able to read the image into a form that can be processed electronically. So the first part of the fax is the scanner. In a simple fax, a document would be fed into the machine and scanned as it passes the scan head. The scan head reads the paper and produces a bit image of the document.

The fax takes the bit image and converts it into a form that can be electronically parcelled for transmission over the phone lines. A dedicated modem in the fax modulates the data into an audio signal that can safely be carried over the public phone network while retaining data integrity.

In receive mode, the internal modem of the fax demodulates the signal and converts it into a form that can be sent to the fax's internal printer. Thus a fax is a scanner, processor, modem and printer. Most modern faxes have the ability to short cut the system and read directly from the scanner to the printer. This makes them a useful occasional photocopier although it's an expensive and slow way to generate photocopies and the thermal paper used by most faxes doesn't produce the best copies.



• *The interQuadram JT fax board sits inside a PC and lets you send faxes at the touch of a key with no paper involved.*

Other bolt-on features can allow a fax to work unattended, sending messages at night when lines aren't busy and calls are cheaper. With all this talk of scanners, modems and printers, you could be forgiven for thinking that fax is an arm of computer technology. Life's never that simple though. While fax uses similar technology to computers, its protocols are different.

GROUP STUDY

The fax protocol was rationalised and defined by the Consultative Committee on Telegraphy and Telephony (CCITT) in Geneva. It initially agreed on a standard protocol for fax and this currently consists of four groups. The original steam-driven clanking faxes of the Seventies were group one. This is a fairly primitive analogue system. A group one fax can take around eight minutes to transmit a page and the quality of the output is what you would expect from earlier technology. If you are considering buying a fax and someone offers you a group one machine, steer well clear unless the vendor is benevolent enough to pay your phone bill too. A cranky group one machine can make a 300 baud modem look positively nippy!

Group two faxes are analogue machines too and can simply be described as the turbo version of group one. Life-expired group two machines are readily available on the market, but before you consider purchase, you should see the output from the machine and perhaps even take a stopwatch to it. A page can take three or four minutes on a group two machine.

Group three brings with it the magic word digital. After the image is scanned in, the data is digitally encoded. This group is the most common of the four and the most widely used. If you are planning to purchase a fax, fax card or fax modem, you should opt for one with group three capability. The extra cash that group three costs will magically pay itself back when Telecom sends its quarterly ransom demand. The only possible reason for buying a machine that supports group one or two is if you will regularly have to send a fax to someone who has a machine that can only support either of the earlier analogue protocols. Some group three machines and cards are backwards compatible, that is they will connect to group one and two machines. It's worth finding out whether or not the machine that you choose can communicate with earlier machines. If it can, you will gain the benefits of compatibility, but a group one or two machine can never hope to match the speed and resolution of later faxes. When you transmit to a lesser machine, you come down to its level of resolution and your transmission will be at the same speed as the slower machine.

A group three machine that conforms to the minimum standard for group three as laid down by CCITT will transmit the same document as a group one machine at least eight times as fast. Because the protocols are only a minimum requirement, some manufacturers have tweaked them to provide even faster and more error free transmission. A desktop fax can be capable of transmitting a page in less than 15 seconds. With the advent of digital read-encoding in group three the modified Huffman protocol was born. In simple terms, modified Huffman describes the way in which the scan data from the analogue scanner is encoded and compressed for transmission along the phone wires.

If you buy a group three machine that has been tweaked by the manufacturer to offer more features than the group three requirement, you should be able to communicate with any other group machine but some of the tweaks may be manufacturer-specific. That is you may only reap the benefits of them if you are transmitting to a similarly equipped fax from the same manufacturer. If these features are noticeable in the price, it's worth considering whether you're ever going to get back what you paid for them.

Finally, group four is a pure digital system designed to work on ISDN digital networks. It hasn't reached the same spread or popularity as group three and, although it's quick efficient and productive, it looks as if group three will remain the de facto standard for the foreseeable future.

PRETTY AS A PICTURE

The resolution of a fax or any other processed document for that matter refers to the amount of detail in the picture. In a fax, the image is recreated a dot at a time. The number of dots per given distance is the resolution. The higher the number, the better the resolution. This magazine is produced through a Linotronic typesetter that is capable of 1,270 x 1,270 dots per inch (dpi). An office laser copier or laser printer can support a resolution of about 300 x 300 dpi.

A group three fax machine has different horizontal and vertical resolution. The image generated consists of 98 vertical by 203 horizontal lines per inch. This means that a fax can contain more detail than the image on a computer screen, but isn't as good as a laser printer. A further development within group three is a 'fine' mode which doubles the vertical resolution to 196dpi. The image is 203 x 196 dpi which effectively doubles the resolution. Other methods of adding grey scales and halftones further enhance the image but at best, the output from a fax is very photocopy-like.

Group four, with its full digital protocol, will offer higher resolution and the research and development departments of the major fax producers have shown some almost photographic faxes but for now, we'll have to be satisfied with group three.

PAPER

With a stand alone fax, the choice is between plain and thermal paper. Most faxes use thermal paper which is a thin glossy paper covered with a transparent dye that turns dark when heated. The paper is expensive and doesn't offer a quality of copy that is pleasant to handle, but being on a roll means that it can support long documents. Standard A4 page width is the most common sized fax, but larger machines are available. A useful feature is a cutter which automatically cuts the paper at page breaks.

Plain paper fax machines produce faxes that look like photocopies and indeed use the same sort of paper as a photocopier. The technology that they use to produce the fax is similar to a photocopier with toner powder being attracted to a drum and then transferred to paper.

A computerised fax using, say, a PC with a fax/scanner card could produce its output to printer or file. The quality of the output depends on the printer, although using a 300x300dpi laser printer wouldn't increase the resolution beyond standard fax levels.

COMPUTER FAX

The recent idea of using the processing power of a computer with some extra hardware to allow it to output to a phone line in fax format wasn't enthusiastically received at first because of the difficulties encountered if the document to be faxed wasn't a file on the computer. Cheap widely available scanners and optical character reading software have changed this and it's possible to perform all of the functions of a group three fax from your computer.

If you own a PC, you are well catered for. There are boxes that plug into the serial port of your PC with all the fax technology on board. This is a good solution if your expansion slots are filled but the widely available fax cards are tidier and a simpler integrated solution.

The PC fax card allows the computer to convert PC generated (or scanned) documents into modified Huffman code and send them directly down the phone to another fax machine.

Some PC fax cards serve more than one purpose with scanner or SCSI interfaces to allow the PC to interface with scanners and mass storage devices. The dual card is useful if expansion slots are at a premium. Optical character recognition software that works with a scanner can be useful to fax users too. This allows the user to scan a document and 'read' the text into a document on the computer rather than taking an image of the document.

Other machines such as the Macintosh are well catered for with fax peripherals, SCSI interfaces, etc, but home computers are limited in what's available. If you own a computer that doesn't have a wide variety of fax peripherals, all isn't lost. A fax modem connects to the serial port of the machine and there are already suites of software to allow Amiga and ST to connect to fax modems originally designed for the PC or Mac. The software isn't widely available in the UK yet, but if the US is anything to go by the Amigafax and STfax is just around the corner. For machines without a dedicated fax interface available or software to allow connection to a fax modem there is still a simple solution. It is generally possible to send ASCII data to a serial port and this in turn can be read by a fax machine that has a serial port as well. This doesn't limit you to expensive fax machines. Even some of the affordable Amstrad machines can do this. To put this ability to the test I prepared a document on a word processor first on a PCW and then on a CPC and had no problems sending them to a couple of fax machines. Of course, you've no way of receiving a fax on these systems and even on some of the well specified PC systems it becomes difficult as the incoming faxes are an image file and these take a lot of storage.

THE RIGHT CONNECTION

There are three basic ways to use your computer with fax. The first and simplest is the traditional way. A document is output from the computer to a printer in the conventional way. It could be anything from a memo to a report or spreadsheet. This is then fed into the stand alone fax machine and the document is scanned and sent along the phone lines to the waiting fax at the other end. This method has the advantage that the computer isn't tied up in the sending of the fax which can be transmitted at a convenient time.

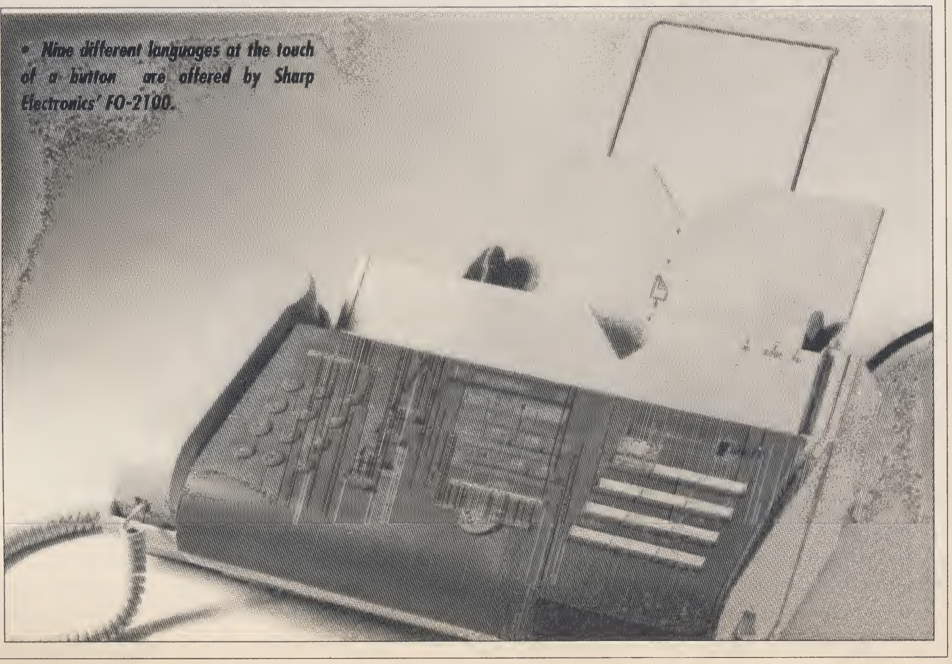
Secondly, some fax machines have a dedicated serial or user port that can be connected to a computer using a suitable cable. This allows basic text files to be sent in ASCII format from the computer to the fax and on to the recipient. Until this facility is more widely used and is expanded to cover high resolution bit image graphics it will be limited to ASCII text. There are a couple of systems which can take a suitable image file from a computer to transmit but as yet systems like these aren't common.

The third option is the dedicated computer fax. This can come as a card for a PC or a standalone fax modem. In its simplest form the software allows it to 'print' a data file to the fax in much the same way as the lead between a computer and fax allows this. With clever software and additional hardware though, it is becoming possible to emulate any feature of a fax with a computer. For example, there are PC fax cards that also include the ability to connect direct to a scanner. This allows you to scan a document in, process it with the fax software and output to printer and/or fax.

On board software can compress image files, but even after this, a single page could take up 70K of disk space. Thus a 14-page document could take a megabyte of hard disk space. A busy company receiving faxes to a PC from its salesforce could easily fill a 40Mb hard disk in a day, so the advantages of PC fax against a stand-alone machine should be considered.

COST

There's no hard and fast rule about what a fax machine will cost. In an afternoon travelling around Bristol, we found second-hand pre-group three faxes for as little as £120. A new fax machine of reasonable specification was on sale for £400. A couple of hundred pounds more and the features started to overtake the basic specification. Finally for a lofty £4,000, we were offered a machine that would send several documents to different numbers at pre-determined times while allowing other faxes to ring up and download from it. ■



• *Nine different languages at the touch of a button are offered by Sharp Electronics' FO-2100.*

AMIGA DATABASE

If you're not sure what a database is – or you know but are not sure what to do with one – Damien Noonan is here to help you with the best Amiga packages on offer.

Databases are the second most popular 'serious' program on the Amiga, after word processing. Basically, they're intended to store big catalogues of information and supply some kind of index system so that you can get at the information you need when you want to. This may seem a tad pointless, but it can be interesting and also useful if you have any big collections of information. You might want to make a catalogue of your record collection, for example, or hold details of your video library.

RECORD BREAKER

Information in a database is stored as a series of 'records' each of which has a number of fields to give further information about it. Each record in a video database, for instance, would be a video. (A record that's a video? Hang on a minute!) Each video record would be split into fields containing: first and foremost, the film's title; perhaps some kind of index number; the director; the star; year of release; running time.

Once you've got all the information in there, there are a couple of things you can do with it. First, you can sort it – which would be an easy way of putting the titles into alphabetical order, for instance, but if you were curious you might want to sort all your films according to year of release. By sorting on two different fields at the same time, you could put them into alphabetical order within each year.

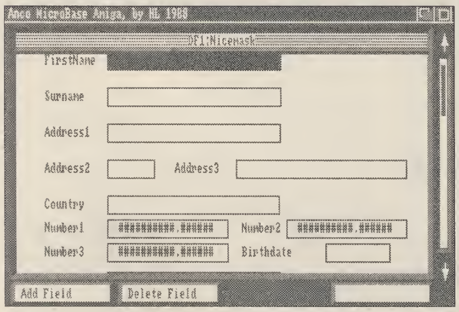
Second, you can search. This allows you to pick out one particular record by looking for a unique quality (a video's title, for example) but also allows you to pick out a number that has something in common: all films that were directed by Paul Verhoeven, for example. Again, by searching on two fields you can find records that share the same qualities: all films made by Paul Verhoeven and starring a certain actor.

BUYING ADVICE

The problem of which package to go for must be resolved from two main considerations. Firstly, is it easy to use? It is pointless buying an "all-singing" package with a programming language if the person using it has no idea of how to program. Secondly, is it affordable? This will depend on individual resources. It is pointless saving money by buying a package incapable of the job demanded. Conversely, it is unwise to spend more money than needed.

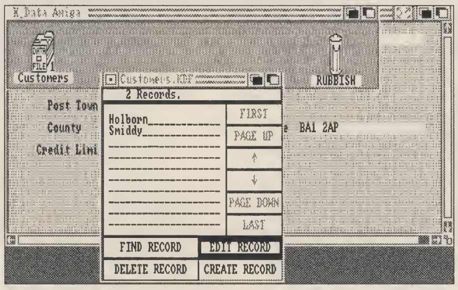
These points apply to all software – especially that in the business sector. Make sure that the needs of the application are completely understood before searching for software to ease the task. Meanwhile, here's a rundown of the sub-£100 databases on the market.

MICROBASE (ANCO • £19.95)



For those on a budget there is only one choice, and although it comes from a company better known for its "adult" card games and one particularly infamous footy game, it performs surprisingly well. Anco's *MicroBase* is a true entry-level database with an entry-level price. It does nothing to rave about – but it is capable and solid. At the price, *MicroBase* is good value for money and an excellent introduction to databases.

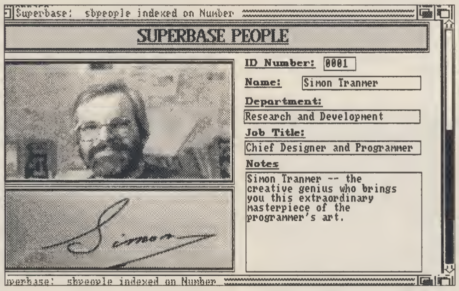
K-DATA (KUMA • £49.95)



Holborn
Smiddy
BA1 2AP

Claimed to be the best-selling flat-card system for the Amiga. Supplied on one disk, it comes in two versions – one for unexpanded A500s and an enhanced version for larger machines. The main fault with *K-Data* is its constant insistence on redrawing and moving windows which tends to make operation slow. Otherwise it is stable enough to be usable under most conditions.

SUPERBASE PERSONAL (PRECISION • £59.95)

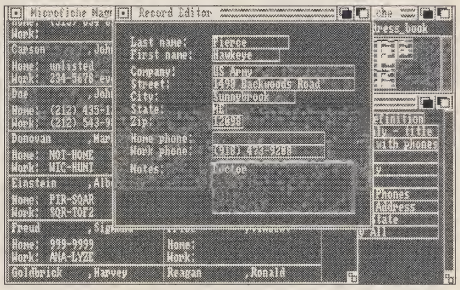


ID Number: 0001
Name: Simon Tranmer
Department: Research and Development
Job Title: Chief Designer and Programmer
Notes: Simon Tranmer -- the creative genius who brings you this extraordinary masterpiece of the programmer's art.

This was the first database to use the revolutionary system of a control panel which resembles a video recorder. This not only allows the user to search through records very quickly, it is also a very easy system to learn. External fields allow graphics and text files to be attached to the database – *Superbase* supports all Amiga IFF graphic modes including HAM.

Three separate modes are available for editing and viewing data: Record view displays the records as a list of fields; Form view allows fields to be "dragged" freely around the screen; and Table view displays the data horizontally with the field names heading each column. Editing is not possible in Table view. *Superbase*'s real power lies in its extensive reporting capability, which is unrivalled in this price bracket. This program has become de facto the leading Amiga database in many respects. It is very good.

MICROFICHE FILER (£69.95)



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First name: Hawkeye
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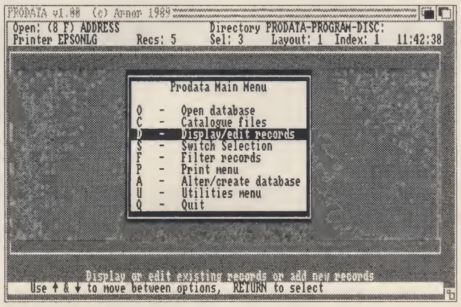
State: ME
Zip: 12898
Home phone:
Work phone: (918) 473-9288
Notes: Doctor

Features a clever interface: the idea is to locate records by scrolling a small magnification window over a larger sheet of "microfiche" – such as those found in libraries. When compared to traditional techniques, this concept seems strange initially, but it soon becomes second nature. *Microfiche Filer* is idiosyncratic in many ways. Nevertheless, its strengths far outweigh its weaknesses in most areas. This is an everyday database, tailored to simple jobs – fun to use and powerful enough for most home user tasks. Not one for the professional though.

PRODATA (ARNOR • £99.95)



```
Open: (8 F) ADDRESS                Directory PRODATA-PROGRAM-DISC:
Printer EPSONLG      Recs: 5       Sel: 3    Layout: 1  Index: 1   11:42:38
```

```
Display or edit existing records or add new records
Use ↑ & ↓ to move between options,  RETURN to select
```

Comes from the purveyors of the fine word processor *Protext*. Like *Protext, Prodata* is aimed at those users content with largely keyboard-based operations and is completely devoid of pop-down menus. That said, it is the most powerful of the flat-card databases and has the professional feel, a comprehensive manual, and support for dozens of printers. ■

Damien Noonan is editor of Amiga Format *magazine. Theses articles are reprinted from his book,* Get the Most Out of your Amiga, *available from Future Publishing Ltd, The Old Barn, Somerton TA11 7BR. Price £9.95.*

THE ATARI ABC

Now, there's a PC-AT compatible that not only solves problems like other AT compatibles, it also solves the one problem that its predecessors have created ... affordability.

Silica Systems are pleased to present the new Atari ABC. The ABC is a 286 AT compatible that runs at over 5 times the performance of the IBM XT. This is achieved by combining the power and speed of a 16-bit 286 processor, with Atari Corp's development experience and engineering capabilities, which use the very latest in design technology. However, the Atari ABC's are available at 'XT prices' and many XT owners will wonder why they paid more, but got less!

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The ABC has a host of impressive features, all built-in as standard, encouraging simple installation and ease of use. In addition, the ABC's small footprint and quiet operating, mean that you will notice it less on your desk than other PC's. Except, of course, when you begin to take advantage of its AT power.

At its remarkably low price point, the ABC is ideally suited for home, office and educational use and will take full advantage of the vast range of PC compatible software. And, with 12 months FREE on-site maintenance (8 hour response), you can rest assured that your ABC will be fully supported.

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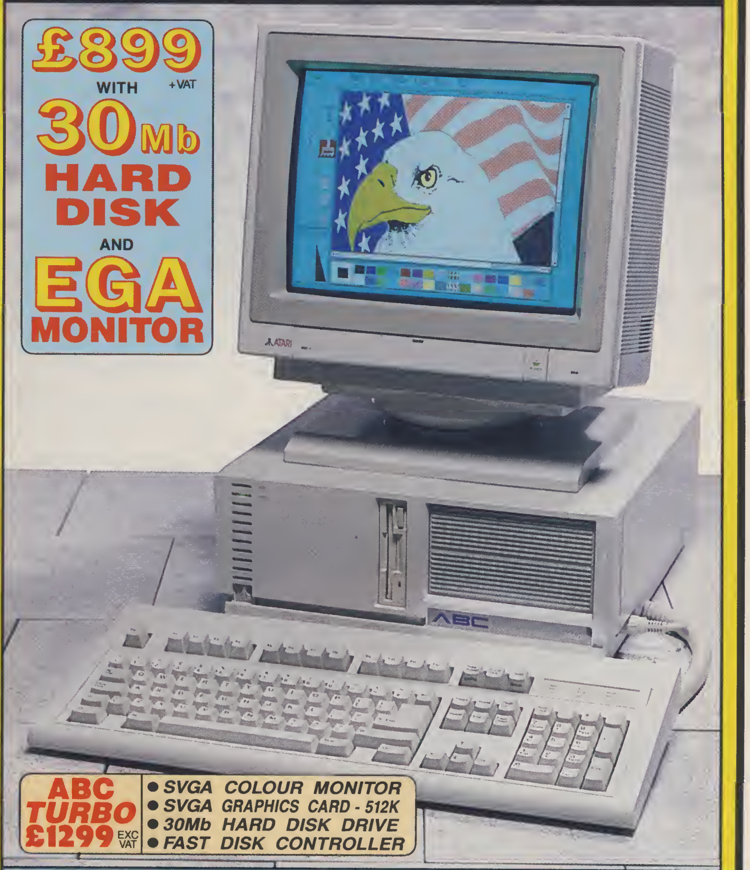

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The beauty of Compuserve lies in the fact that it has an answer for everything. If you need information, it's there. If you want to buy a car or a bunch of flowers it's there. *Express* logged on to Compuserve to see what it could do. We peeked in a couple of the many software download areas and worked out that there was enough software available to more than fill every hard disk in the office.

Compuserve must be in line for the title: "Biggest shop in the World" and it's as close to us all as a micro, modem and phone line. Compuserve is getting bigger too. When the UK on line service Microlink decided to close its doors, members were offered transfer to Compuserve thus giving it a readily established UK user base to add to its own users. Talk to anyone in the US about comms and the chances are that they'll ask if you've a Compuserve account.

All you have to do to get a free registration worth £20, £12 of free on-line time and the necessary info to get on line is answer five simple questions about comms and complete a tiebreaker. The first 20 out of the editor's hat will get the on-line prizes. To make life even better, a winner's winner will be drawn and will receive an extra £25 worth of on-line time as well as some essential books on on-line services .

1) Where does the word MODEM come from?
a) An abbreviation for Modulator/Demodulator
b) It works in the protocol Mode M.
c) It was invented by Dr Heinz Von Modemhof
d) The inventor couldn't spell model

2) What is the biggest On-Line service available in the UK?
a) Aspects BBS
b) CIX
c) Compuserve
d) Express on Line

3) Which of these isn't to do with Modems
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b) 8N1
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4) Which town with the dial code 0272 is Compuserve based in in the UK?
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c) Bridlington
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ocean

The Commodore A500 Batman Pack must surely rank as one of the most popular computer packs ever! The pack features the **Commodore Amiga 500 computer** with **mouse controller** and **TV modulator**, plus four top software titles. The software includes: **'Batman The Movie'** - Rid Gotham City of the cunning joker, in Ocean's top selling title based on the blockbuster Batman film; **New Zealand Story** - high quality conversion of the leading arcade game; **Interceptor** - Dogfight with two F-16's in this leading flight simulator; **Deluxe Paint II** - top quality Amiga graphics package which set the standard for others to follow. Return the coupon for further details.

PACK INCLUDES:

A500 Computer & Mouse	£399.99
A520 TV Modulator	£24.99
Batman The Movie	£24.95
New Zealand Story	£24.95
Interceptor	£24.95
Deluxe Paint II	£49.95
TOTAL RRP:	£549.78
Less Pack Saving:	£150.78
PACK PRICE:	**£399.00**

£399 INC VAT

AMIGA 2000

For the more serious or professional applications user, Commodore have a selection of systems based around the expandable Amiga 2000, at prices from £1295+VAT. The A2000 features a full 1Mb RAM (expandable to 9Mb), 9 system expansion slots, plus IBM compatibility with the use of PC-XT or PC-AT bridgeboards. Complete and return the coupon, putting a tick in the A2000 box, for details of A2000 computer systems.

£1295 +VAT= £1489.25

FLIGHT OF FANTASY

Flight of Fantasy is the very latest Amiga 500 pack from Commodore, featuring BRAND NEW software releases, to make this the most spectacular A500 pack ever! The pack features the Amiga 500 computer with mouse controller and TV modulator, as well as four top software titles. These include the following:

DELUXE PAINT II:

The high quality graphics program that set the standard for other Amiga art packages. Deluxe Paint II includes powerful, easy to use tools that bring out the artist in you. Create masterpieces, presentations, 3D perspectives or just doodle.

ESCAPE / ROBOT MONSTERS:

Here's something completely different - a science fiction story with comic book style graphics. Our heroes Jake and Duke are on the Planet X rescuing Humans who have been captured by the Robot Monsters and forced to create an evil Robot Army to DESTROY EARTH! Jake and Duke fight their way through hordes of evil Robots to help the Humans escape.

RAINBOW ISLANDS:

Slip on your magic shoes, practise throwing a rainbow and you're ready to go island hopping. From the Island of Doh to Monster Island, you will encounter Doh himself, stinging insects, lethal combat machines, mechanical assailants, the formidable beings of legend and folklore. Finally enter the world of darkness and its inhabitants.

F29 RETALIATOR:

The ultimate in flight simulation with a choice of two aircraft and four battle environments with dozens of different tactical missions. Aerial combat, strategic bombings, interactive ground based battles, seagoing carriers ... the list of features is endless. Real time cockpit displays, including 'true radar' enhance the realistic feel of this stunning simulation.

PACK INCLUDES:

A500 Computer & Mouse	£399.99
A520 TV Modulator	£24.99
Deluxe Paint II	£49.95
Escape/Robot Monsters	£19.99
Rainbow Islands	£24.95
F29 Retaliator	£24.95
TOTAL RRP:	£544.82
Less Pack Saving:	£145.82
PACK PRICE:	**£399.00**

£399 INC VAT

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Before you decide when to buy your new Amiga computer, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after buying your Amiga, when you may require additional peripherals or software, or help and advice with your new purchase. And, will the company you buy from contact you with details of new products? At Silica Shop, we ensure that you will have nothing to worry about. Silica have been established for over 12 years, and have an annual turnover of £13 million. With our unrivalled experience and expertise, we can now claim to meet our customers requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest Free literature and begin to experience the "Silica Shop Service".

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a keyboard
worth £300

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All you need to know to set up a music system around *your* computer -

- Hardware Guides
- Software Guides
- Peripherals

What exactly is MIDI?
The mystery explained

Top of the scale? Express investigates the £400,000 Synclavier dream machine

Greetings
Display = 2440
1
UP DN
ADD
DEL
SEQ
REPEAT
PLAY->
STOP
SEQUENCE
DISPLAY
RANGE
LOOP
SHOW RANGE
SHOW ALL
ZOOM OUT
RANGE ALL
VOLUME
<<< >>>
SEEK ZERO
SEEK LOOP
LOOP ON
Aegis AudioMaster III

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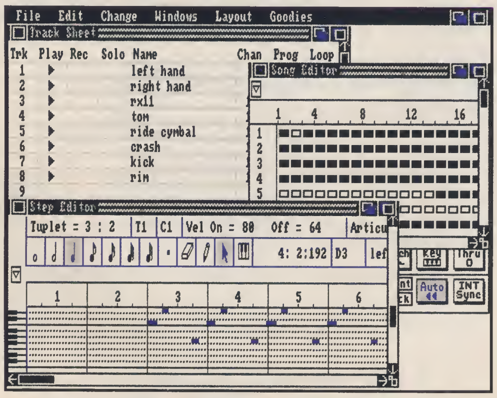
Samplers...


File
Edit
Change
Windows
Layout
Goodies
Track Sheet
Song Editor
Step Editor
Key
Thru
Auto
INT Sync

```
Trk  Play Rec  Solo Name          Chan  Prog  Loop
 1    ▶              left hand
 2    ▶              right hand
 3    ▶              rx11
 4    ▶              tom
 5    ▶              ride cymbal
 6    ▶              crash
 7    ▶              kick
 8    ▶              rim
 9
```

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Tuplet = 3 : 2   T1  C1  Vel On = 80   Off = 64   Articu
4: 2:192  D3
```
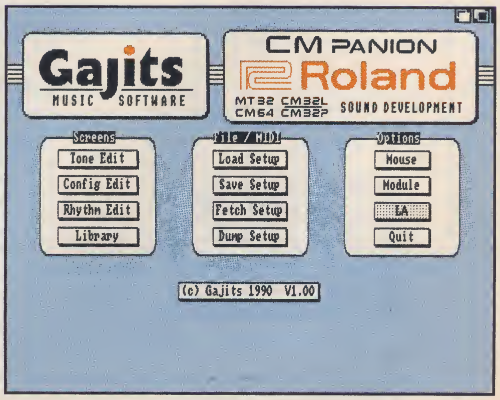

...Sequencers...


Gajits
MUSIC SOFTWARE
CM PANION
Roland
MT32 CM32L
CM64 CM32P
SOUND DEVELOPMENT
Screens
Tone Edit
Config Edit
Rhythm Edit
Library
File / MIDI
Load Setup
Save Setup
Fetch Setup
Dump Setup
Options
Mouse
Module
LA
Quit

(c) Gajits 1990 V1.00

...Synthesisers

AT-A-GLANCE GUIDE – OVER 70 PROGRAMS LISTED

Welcome to the *New Computer Express* Music Guide.

Computers have been derided as being too clinical to be involved in the art of music making. Recently however, such tricks as sampling, synthesising and digital recording have opened new horizons for even the humblest micro.

The chances are that the computer you have at home or at work – even the one you are thinking of buying – has the capacity to help you express your musical ideas and unleash you creativity.

This guide aims to introduce you to some of the many software, hardware and peripheral options open to you. We have tried to include as many reviews of products currently on the market as space would allow. And just to give a hint at what could be on your desk in another ten years try looking at the Synclavier 9600 system on page 20. Cost? £400,000 and worth every penny piece...

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A symphony of software

We take a look at the current crop of music software for the home computer. An overview of more than 70 programs in one easy guide

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The musical micro

You might think that your computer is the best, but how does it rate as a music machine?

Pages 10, 11

Jargon explained

We're obviously going to have to use a lot of unfamiliar terms, but that doesn't mean that you have to be left in the dark. Do the knowledge...

Page 12

Chasing the charts

Now that you've made some music what can you do with it? Just how important is music in the computer world? How could you get to write a game sound track? That's enough questions... We ask Eric Matthews of Renegade for the answers

Page 14

Amiga adagio

A run-down on the Amiga as an instrument...

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Musical add-ons

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Music in the machine

The tunes your machine can play solo...

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That Musical Instrument Digital Interface in full...

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Tame that tune

A step-by-step guide to writing computer music

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WIN!

A £300 MIDI keyboard

A Cheetah Master Series is up for grabs.

Page 30

A Symphony of Software

You have the hardware. You have the best-selling tune in your head. Now choose your software. We take a look at the best and the rest of the packages around.

What follows is a brief summary of most of the music software currently available; we simply didn't have space for everything. The main thing to look out for is upward compatibility, or to put it another way, "Can I expand and improve on the software I have without throwing away what I have already done?". One way that software developers have tried to do this is with 'multiple environments' where several programs can co-exist and be called to the fore as required. If the programs are from the same stable or there has been some friendly agreement between software developers then it is likely that alterations made may well be noted in the other programs. Even if this is not the case, the additional software will hang around as a desk accessory. Two companies: Dr T and Steinberg have their own environments called *MPE* and *MROS* respectively. Another company, C-Lab has *Softlink.* All three are working towards some mutual compatibility for peaceful co-existence under one computer. Good software developers will provide upgrading software for existing owners at reasonable prices. With programs interlocking like this, the spectre of incompatibility diminishes considerably.

All prices quoted are the RRP and should be taken as a guide only. You may be lucky and get a discount deal, or you might find that the price has risen due to an upgrade.

MIDI Sequencers

Perhaps the best known type of music software, MIDI sequencers come in all shapes and sizes, from the Public Domain to those mega expensive versions that dominate the professional music world and are replete with infinite editing facilities. The usual mark of excellence is ease of use coupled with hosts of labour-saving musically intelligent routines.

Ideally, sequencer software will also be able to save in MIDI file format so that work on one sequencer can be transferred to another without tears. We've tried to include most of the favourites on the market but drew the line at professional scoring packages.

Creator/Novator v.03

For Atari ST 1040/Mega ST
From C-Lab (Sound Technology)
Tel: 0462 480000
Price £289/£495

One of the most widely used of sequencers, *Creator* 3 has many new editing and arranging features that enable you to draw in velocity curves and drum patterns. It also has advanced intelligent quantize features. It can be expanded with hardware to control up to 96 MIDI channels independently. Notator is the score printing version, which has been updated too.

PROS AND CONS

+ MIDI file compatibility
+ SMPTE read and generate facilities
+ Manual now radically re-written and logical
+ Can interact with other software
– Expensive
– Doesn't have multi-window facility which is fast becoming popular on sequencers of this type.

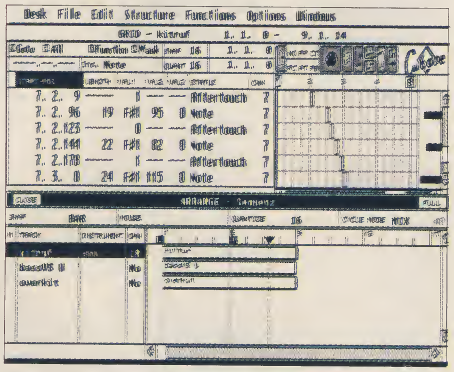
Cubase v2/Cubeat

For Atari ST 1040/Mega ST and Macintosh
From Evenlode
Tel: 099 389 8484
Price £475/£299

Very popular amongst the professional users, it has multiple window environment and a very simple arrangement page. Clever software modules send out set-up data and sounds for synths and it will multi-task with other programs. Cubeat is the cut-down version.

PROS AND CONS

+ Very easy to use
+ Has a whole armoury of slick features
+ Multiple window environment makes it very quick in operation
+ Can have SMPTE read/generate and multiple channel add-ons
+ Can interlink with word processor and control Fostex multi-track tape machines
– Price
– Could be too detailed for the beginner.



CUbase *shows off its multiple windows*

Omega

For Atari ST
From Dr T
Tel: 081 963 0663
Price £299

Brand new sequencer that combines the graphic features of *TigerCub* along with the capacity of KCS Level 2. It supports the Multi Program Environment and will also interact with certain other ST music software. 48 tracks plus a powerful song arrange feature.

PROS AND CONS

+ Has many advanced features
+ Will run with many other programs on-board (provided you have the memory and the right programs)
+ Can be expanded up to 64 MIDI channels
+ High level of accuracy
– Not cheap
– So new it hasn't had a full testing yet.

Prism

For PC
From Digital Music
Tel: 0703 252131
Price £109

16 track sequencer with neat, quick way of working and smart presentation à la Macintosh. Uses graphics to control velocities and other MIDI parameters and has been well-liked by all who have used it. Digital Music do a neat package deal of this plus a MIDI interface for £189.

PROS AND CONS

+ Good value for money
+ Easy to use
+ Excellent manual
+ Importers offer excellent package with interface
– Software house only make one other (excellent) sequencer which might make upgrading awkward.

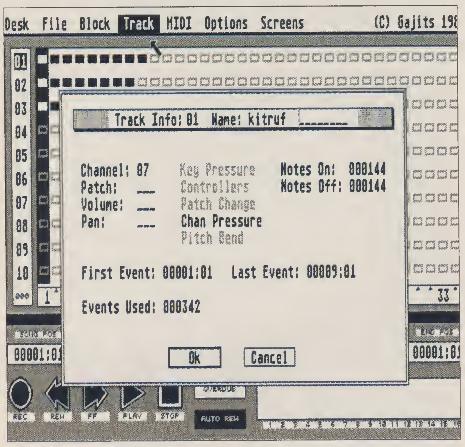
Sequencer 1

For All ST's and Amiga
From Gajits
Tel: 061 236 2515
Price £89

Well-priced 32 track sequencer that serves as an excellent introduction to sequencing. Short patterns can be earmarked as blocks and moved around and there is a cue list for the blocks on the main screen. Editing individual notes is a little time-consuming but bearable. The Amiga version allows you to use the internal voices.

PROS AND CONS

+ Good value for money
+ Good editing that is easy to see and cope with
+ Good arrange feature
+ Supports Midi File
+ Cue list
+ Runs on ST520 and A500
– Does require data entered from the keyboard at times.



Track Info: 01 Name: kitruf

Channel: 07
Patch: ---
Volume: ---
Pan: ---
Notes On: 000144
Notes Off: 000144
First Event: 00001:01 Last Event: 00009:01
Events Used: 000342

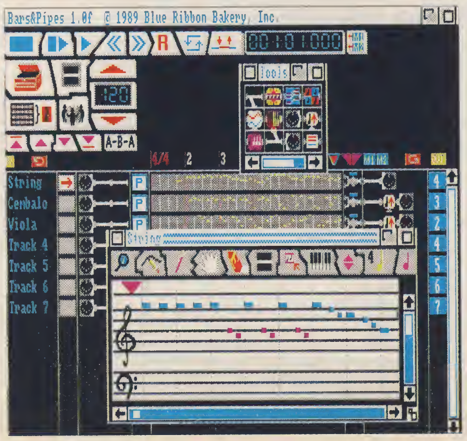
Block editing with Sequencer 1

Bars and Pipes 1.0f
For All Amigas with 1Mb memory
From Precision Software or Newtronic
Tel: 081 330 7166/081 659 0744
Price £219.95

Highly original program that has very good graphic approach to sequencing, routing the data literally through on-screen water pipes. Music Tools are devices that you can insert in the data 'stream' and these have many functions, some of which generate new music lines from your input, provide echo facilities, harmonise etc. There are additional disks of tools that you can buy which include using the internal voices. Professional and Junior versions are planned.

PROS AND CONS

+ Simple to use
+ Lots of very musical features
+ Add-ons available
+ Can handle lyrics and print outs
+ Can cope with 80 MIDI channels
– Not cheap
– Note editing not too hot



– Definitely needs colour monitor

Cosh Sequencer
For All ST's
From All good PD Libraries
Price £2 – £4 approx.

Really quite amazing value for money, as the *Cosh Sequencer* is a superb piece of software that has advanced features such as tempo change coupled with good graphic editing, track listing, punch in and out, track copying, and quantizing. You wonder where the strange name came from? Well violence is not involved as it was named after its programmer, Henry Cosh.

PROS AND CONS

+ Price
+ Well thought-out program
+ Full manual on disk
+ Many features
– Some slight idiosyncracies in operation.

Quartet
For Amigas/ST
From Microdeal
Tel: 0726 68020
Price £24.95

Interesting sequencer that uses internal voices but can also output MIDI in each track. Makes a handy place to start. It will also work with IFF samples (Amiga Version).
– Amiga version is an improvement on SY version.

PROS AND CONS

+ Cheap
+ Supports MIDI and internal sounds
+ Very visual
– Editing features not too good
– A bit basic as sequencers go.

Musician
For All Amigas
From Thalamus
Tel: 0734 81726
Price £29.99

Very powerful program that can squeeze that last drop of sound from the internal chip as well as editing samples. Excellent graphics help you to do this as well as some rather slick routines. Sequencing is with strings of data, again with smart routines to help you.

PROS AND CONS

+ Price
+ Very powerful
+ Ideal for games soundtracks
+ Superb sound creation
– Not very good if you are a beginner
– Only accepts MIDI inwards.

Trackman II
For All ST's
From First Rate Ltd
Tel: 0481 23169
Price £199

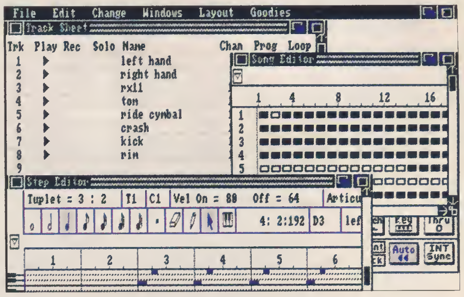
Trackman II is very much a musician-led program; that is to say, it is simple and instinctive to use but it has many advanced features should you choose to call them in. Auto mixdown, full MIDI control and drum maps among other facets, plus interaction with Midiman, the universal editor.

PROS AND CONS

+ Lots of facilities
+ Very easy to understand and use
+ Loads Midi Files
+ Good and simple editing
– Initial price.

Trax
For Macintosh /PC/Amiga/ST
From Passport
Tel: 081 963 0663
Price £99

Nice entry-level sequencer with Macintosh type display using multiple windows. Easy to use and understand with song edit function.



Trk	Play	Rec	Solo	Name	Chan	Prog	Loop
1	▶			left hand			
2	▶			right hand			
3	▶			rxll			
4	▶			tom			
5	▶			ride cymbal			
6	▶			crash			
7	▶			kick			
8	▶			rim			
9							

Tuplet = 3 : 2 T1 C1 Vel On = 80 Off = 64 Articu
4: 2:192 D3 lef

Multiple windows are just one aspect of Trax

PROS AND CONS

+ Price
+ Easy to use
+ Multiple window
– Editing not very quick
– Can't expand beyond 16 MIDI channels.

Prodigy
For Atari ST 1040
From The Digital Muse/Audio Software
Tel: 071 586 3445
Price £129

32 track cut-down version of Virtuoso which has some very fast features including 'piano roll' style editing and advanced quantize. It takes a little bit of getting used to but the promised add-ons, like scoring packages and GEM compatibility, go some way to making up for this, and reward the time spent.

PROS AND CONS

+ Very fast – thanks to re-writing of screen management
+ Accurate
+ Can perform disk operations whilst still running
+ Can upgrade to Virtuoso
– Editing could be smarter.

Beyond V2
For Macintosh
From Dr T
Tel: 081 963 0663
Price £259

99 track sequencer with high resolution accuracy and some interesting harmonization and 'humanization' routines plus good editing.

PROS AND CONS

+ Many professional features
+ Graphic editing and display
+ Can be expanded to run 512(!) MIDI channels
+ Auto mixdown
+ Easy to use
– No notation or data editing
– Not cheap.

Harmoni
For All Amigas
From The Disk Company
Tel: 010 331 4910 9995
Price £49.99

Well-priced Amiga sequencer that has quite a few up-market features. Included for your musical pleasure are

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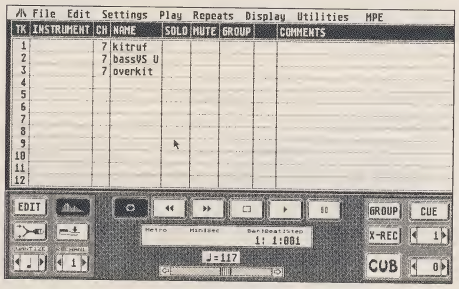


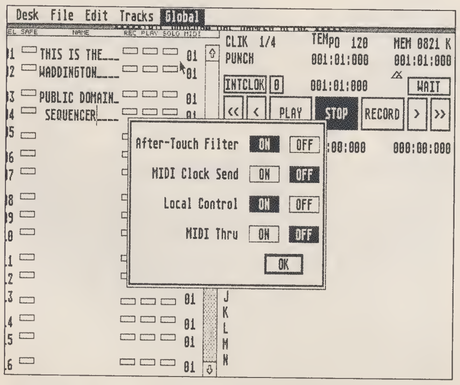
TK	INSTRUMENT	CH	NAME	SOLO	MUTE	GROUP		COMMENTS
1		7	kitruf					
2		7	bassVS U					
3		7	overkit					
4								
5								
6								
7								
8								
9								
10								
11								
12								

The busy looking work screen from the Tiger Cub.

+ Good editing that is easy to see and cope with
+ Good arrange feature
+ Supports Midi File
+ Cue list
+ Runs on ST520 and A500
– Does require data entered from the keyboard at times.

Bars and Pipes 1.0f
For All Amigas with 1Mb memory
From Precision Software or Newtronic
Tel: 081 330 7166/081 659 0744
Price £219.95

Highly original program that has very good graphic approach to sequencing, routing the data literally through on-screen water pipes. Music Tools are devices that you can insert in the data 'stream' and these have many functions, some of which generate new music lines from your input, provide echo facilities, harmonise etc. There are additional disks of tools that you can buy which include using the internal voices. Professional and Junior versions are planned.



THIS IS THE___
WADDINGTON____
PUBLIC DOMAIN_
SEQUENCER____

After-Touch Filter [✓ ON] OFF
MIDI Clock Send ON [✓ OFF]
Local Control [✓ ON] OFF
MIDI Thru ON [✓ OFF]

The public domain Waddington Sequencer *doing its stuff.*

PROS AND CONS

+ Simple to use
+ Lots of very musical features
+ Add-ons available
+ Can handle lyrics and print outs
+ Can cope with 80 MIDI channels
– Not cheap
– Note editing not too hot
– Definitely needs colour monitor

Cosh Sequencer
For All ST's
From All good PD Libraries
Price £2 – £4 approx.

Really quite amazing value for money, as the *Cosh Sequencer* is a superb piece of software that has advanced features such as tempo change coupled with good graphic editing, track listing, punch in and out, track copying, and quantizing. You wonder where the strange name came from? Well violence is not involved as it was named after its programmer, Henry Cosh.

PROS AND CONS

+ Price
+ Well thought-out program
+ Full manual on disk
+ Many features
– Some slight idiosyncrasies in operation.

Quartet
For Amigas/ST
From Microdeal
Tel: 0726 68020
Price £24.95

Interesting sequencer that uses internal voices but can also output MIDI in each track. Makes a handy place to start. It will also work with IFF samples (Amiga Version).
– Amiga version is an improvement on SY version.

PROS AND CONS

+ Cheap
+ Supports MIDI and internal sounds
+ Very visual
– Editing features not too good
– A bit basic as sequencers go.

Musician
For All Amigas
From Thalamus
Tel: 0734 81726
Price £29.99

Very powerful program that can squeeze that last drop of sound from the internal chip as well as editing samples. Excellent graphics help you to do this as well as some rather slick routines. Sequencing is with strings of data, again with smart routines to help you.

PROS AND CONS

+ Price
+ Very powerful
+ Ideal for games soundtracks
+ Superb sound creation
– Not very good if you are a beginner
– Only accepts MIDI inwards.

Trackman II
For All ST's
From First Rate Ltd
Tel: 0481 23169
Price £199

Synthesisier Voicing and Library Software

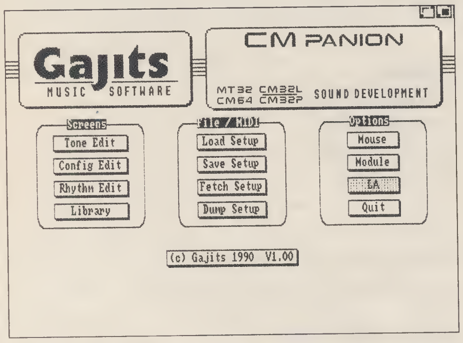
One of the great boons of MIDI, especially with the complex multi-timbral synths/tone modules that are on the market, is that you can see the set-up on screen instead of labouring over LCDs.

Many programs have automatic voice generation to help with creating new sounds. There are rather a lot of voicing programs about and to list them all, let alone attempt to make a buying choice, would be a daunting and essentially pointless task. The next section therefore will point you in the right direction.

The buzzword to watch for is 'universal editor'; a voice editor that can be configured for any synth – provided you know your way around the system's exclusive MIDI codes or can buy a workable template which suits your needs.

Trackman II is very much a musician-led program; that is to say, it is simple and instinctive to use but it has many advanced features should you choose to call them in. Auto mixdown, full MIDI control and drum maps among other facets, plus interaction with Midiman, the universal editor.

PROS AND CONS
+ Lots of facilities


Gajits
MUSIC SOFTWARE
CM PANION
MT32 CM32L
CM64 CM32P
SOUND DEVELOPMENT
Screens
Tone Edit
Config Edit
Rhythm Edit
Library
File / MIDI
Load Setup
Save Setup
Fetch Setup
Dump Setup
Options
Mouse
Module
LA
Quit
(c) Gajits 1990 V1.00

Options for voicing Roland synths and modules curtesy of the Companion

+ Very easy to understand and use
+ Loads Midi Files
+ Good and simple editing
– Initial price.

Trax
For Macintosh /PC/Amiga/ST
From Passport
Tel: 081 963 0663
Price £99

Nice entry-level sequencer with Macintosh type display using multiple windows. Easy to use and understand with song edit function.

PROS AND CONS
+ Price
+ Easy to use
+ Multiple window
– Editing not very quick
– Can't expand beyond 16 MIDI channels.

Prodigy
For Atari ST 1040
From The Digital Muse/Audio Software
Tel: 071 586 3445
Price £129

32 track cut-down version of Virtuoso which has some very fast features including 'piano roll' style editing and advanced quantize. It takes a little bit of getting used to but the promised add-ons, like scoring packages and GEM compatibility, go some way to making up for this, and reward the time spent.

PROS AND CONS
+ Very fast – thanks to re-writing of screen management
+ Accurate
+ Can perform disk operations whilst still running
+ Can upgrade to Virtuoso
– Editing could be smarter.

Beyond V2
For Macintosh
From Dr T
Tel: 081 963 0663
Price £259

99 track sequencer with high resolution accuracy and some interesting harmonization and 'humanization' routines plus good editing.

PROS AND CONS
+ Many professional features
+ Graphic editing and display
+ Can be expanded to run 512(!) MIDI channels
+ Auto mixdown
+ Easy to use
– No notation or data editing
– Not cheap.

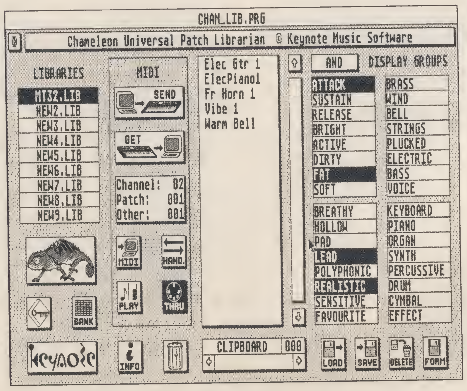
Harmoni
For All Amigas
From The Disk Company
Tel: 010 331 4910 9995
Price £49.99

Well-priced Amiga sequencer that has quite a few up-market features. Included for your musical pleasure are looping, filtering, arpeggiation and pattern reversal, SMPTE time display, pattern sequencing.

PROS AND CONS
+ Price
+ Features
– Editing and quantization a bit basic
– Doesn't support internal voices
– Pattern sequencing limited.

Vision/EZ Vision
For Macintosh
From Opcode
Tel: 081 963 0663
Price £399/£115

Professional-level sequencer with many superb features. High degree of accuracy and multiple window display using graphic curves to draw in control functions. See *Studio Vision* in the Direct to Disk section for news of an update. There is also a junior version called *EZ Vision*.

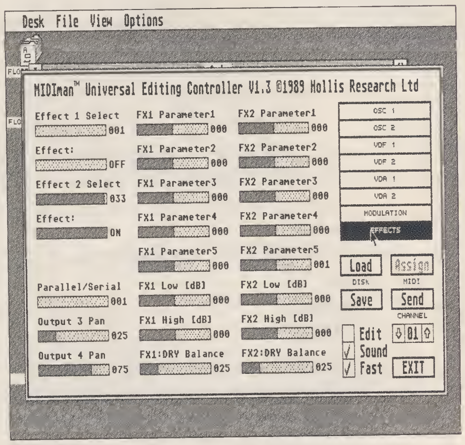

CHAM_LIB.PRG
Chameleon Universal Patch Librarian © Keynote Music Software
LIBRARIES
MT32.LIB
NEW2.LIB
NEW3.LIB
NEW4.LIB
NEW5.LIB
NEW6.LIB
NEW7.LIB
NEW8.LIB
NEW9.LIB
MIDI
SEND
GET
Elec Gtr 1
ElecPiano1
Fr Horn 1
Vibe 1
Warm Bell
AND
DISPLAY GROUPS
ATTACK
SUSTAIN
RELEASE
BRIGHT
ACTIVE
DIRTY
FAT
SOFT
BREATHY
HOLLOW
PAD
LEAD
POLYPHONIC
REALISTIC
SENSITIVE
FAVOURITE
BRASS
WIND
BELL
STRINGS
PLUCKED
ELECTRIC
BASS
VOICE
KEYBOARD
PIANO
ORGAN
SYNTH
PERCUSSIVE
DRUM
CYMBAL
EFFECT
MIDI
HAND.
PLAY
THRU
BANK
keynote
INFO
CLIPBOARD
LOAD
SAVE
DELETE
FORM

Channel: 02
Patch: 001
Other: 001
CLIPBOARD 000

The Chameleon universal librarian accessing voices by responding to attributes

PROS AND CONS
+ Very professional package
+ Help screens
+ One of the first that can upgrade to digital recording
– Rather expensive
– Only takes 32 MIDI channels
– Requires 2Mb memory.

Track 24
For Atari ST series and Amiga
From Comus/Soundbits
Tel: 021 733 2063
Price £75


Desk File View Options
MIDIman™ Universal Editing Controller V1.3 ©1989 Hollis Research Ltd
OSC 1
OSC 2
VDF 1
VDF 2
VDA 1
VDA 2
MODULATION
EFFECTS
Load
Assign
DISK
MIDI
Save
Send
CHANNEL
EXIT

Effect 1 Select 001
Effect: OFF
Effect 2 Select 033
Effect: ON
Parallel/Serial 001
Output 3 Pan 025
Output 4 Pan 075
FX1 Parameter1 000
FX1 Parameter2 000
FX1 Parameter3 000
FX1 Parameter4 000
FX1 Parameter5 000
FX1 Low [dB] 000
FX1 High [dB] 000
FX1:DRY Balance 025
FX2 Parameter1 000
FX2 Parameter2 000
FX2 Parameter3 000
FX2 Parameter4 000
FX2 Parameter5 001
FX2 Low [dB] 000
FX2 High [dB] 000
FX2:DRY Balance 025
☐ Edit
☑ Sound
☑ Fast
CHANNEL 01

MidiMan's universal librarian and voice editor

Well-priced budget sequencer with features rivalling software twice its price. 24 tracks for you to play with and record on. It is able to record chords on one of those tracks in step-time by typing in the name and type of chord. Manipulation of marked blocks of music is not too good but you can do a real-time mixdown which can include tempo changes. Editing uses traditional music notation. Compatible with more up-market sequencers/arrangers and scoring packages; Studio 24, Big Band and ProScore which are also from the same company.

PROS AND CONS
+ Cheap
+ Good sequencing facilities including Mixdown
+ MIDI file capabilities
– Editing is peculiar
– A bit slow in working
– Does not support internal voices.

Steinberg Pro 24 v3
For Atari ST1040
From Evenlode
Tel: 099 389 8484
Price £95 approx.

This piece of software goes to show just how fast the pace of change can be in the world of computer music. *Steinberg Pro 24* was accepted in many areas of the music world as the industry standard sequencing software for many years. It is now available at some stupidly low prices. Although outdone by other packages in features it is nevertheless very intuitive to use and offers an excellent introduction for the beginner in computer music.

PROS AND CONS
+ Easy to use
+ Established program
+ Easy editing
– Arranging section not too easy to work with.

KCS Level 2

For Atari ST, Amiga, PC, Macintosh
From Dr T
Tel: 081 963 0663
Price £225

Runs on 48 tracks, has loads of features and is the most popular sequencer from Dr T's wide range. Works well as a base unit and can be expanded along with your skills and requirements. Add-on programs to enhance editing features and also music printing are readily available.

PROS AND CONS
+ Well-established program
+ Upgrades and works with other software
+ MIDI file
– Editing not easy

SAMPLERS

The Public Domain market is full of samples of all sorts, from Kylie and Jason through the Classics to Thunderbirds.

However, to actually digitise sound you will need hardware and this is where the expense comes in. The main points to remember are that editing needs to be clear and easy, sounds should be able to be filed away to be re-used in other utilities, and MIDI support is a must for the serious user.

Tiger Cub
For Atari ST/STE, Amiga
From Dr T
Tel: 081 963 0663
Price £99

Low cost 12 track sequencer that provides a good introduction to sequencing. Has really advanced graphic editing with the ability to draw in tempo changes, pitch bend, modulation, volume and velocity curves. It comes with a simple scoring package. The Amiga version supports the internal voices, as does the STE version.

PROS AND CONS
+ Easy to use
+ Low Cost
+ Superb graphic editing for its price
+ Well documented and presented on-screen
– One or two peculiarities in the way it works
– Will take up a large chunk of memory, especially with Amiga samples and scoring facility.

Waddington Sequencer
For All Atari ST's
From Public Domain
Price about £2-£4

Although limited in facilities like quantize and editing, it does provide a basic grounding in the function and possibilities of sequencing software. Another obvious point in its favour is the price, or rather lack of it. If you only want to test the waters of computer music then this is definitely worth having a look at.

PROS AND CONS
+ Costs next to nothing
+ Excellent introduction to MIDI sequencing
+ Easy to use
– Limited facilities
– Can crash on occasions.

EZ Track Plus
For Atari ST
From Syndromic Music
Tel: 081 444 9126
Price £49.95

Again the price is low but this time there is not much to recommend the software or to deride it. Basically it's a reasonable sequencer which is fairly easy to use. Compatible with other Hybrid Arts programs that also boast a multi program environment. Limited on quantizing but not bad for the money.

It is also a program which was built with the computer user rather than the musician in mind; editing is in data only. As long as you're not expecting to score Francis Ford Coppola's latest film or write a concerto you could be alright as one point *EZ Track Plus* does have is that it is good for organising songs.

PROS AND CONS
+ Good price
+ Easy to use
+ Compatible with Hybrid Arts *EZ Score*
– Limited on editing and quantizing.

Studio 4 Mk 1
For Archimedes
From EMR
Tel: 0702 335747
Price £99

We have already mentioned that the Archimedes is an excellent machine in terms of its musical potential. The major downside is the cost and availablity of software. Studio 24 shows well on the price front, being the cheapest sensible sequencer for the machine. However, it does cut a few corners here and there, but it is not a bad sequencer, with average editing facilities.

PROS AND CONS
+ Best for the Archimedes in this price range
+ Can be upgraded to more powerful Mk2
+ Very fast
– Poor documentation
– Editing of data non-graphic.

CZ Android
For Atari ST
From Syndromic Music
Tel: 081 444 9126
Price £75 but often cheaper.

If you have a Casio CZ synthesiser – a four year old range of machines which were all the rage at the time and which can now be picked up for around £50 – then get Android. On their own CZs are pigs to program and the preset sounds are, to put it mildly, rancid. Use this, and your CZ will never sound the same. Not a new program but tried, tested and found to be workable.

PROS AND CONS
+ Easy to use
+ Excellent graphics
+ Good library facilities.

MULTIPLE PURPOSE PROGRAMS

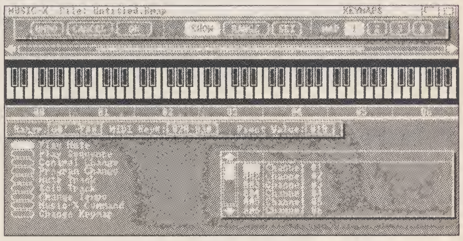
The 'all talking, all singing, and all dancing' section. These are programs that cross over from having just one dedicated function. In the case of much vaunted *Music-X* you have a complete music studio in one rather elegant casing. The other programs which we have included here are mainly for fun, although some serious work can be done with them.

Companion/4D Companion
For Atari ST and Amiga
From Gajits:
Tel: 061 236 2515
Price £99

A smart piece of software that not only covers the Roland D110/MT32/CM32/CM64/ modules but also the D10 and D20 keyboard versions.

PROS AND CONS
+ Voice creating feature
+ Easy to use
+ Configures a very difficult instrument
+ Amiga version will multi-task
– Roland's versions of the D110 may not work with it (or any other software!)

Dr T *Caged Artist Series*



Music-X splits keyboard sounds into zones

For Atari ST, Amiga, Macintosh
From Dr T
Tel: 081 963 0663
Price: (approx) £120

Solid series of voice editors for a whole pile of synthesizers/tone modules/effects units. Their principle features are graphic editing, extensive library features, random voice creation, multiple bank storage and editing and voice merging.

PROS AND CONS
+ Well established
+ Good features
+ Can run with other Dr T and certain other software
+ Pricey in some cases.

Steinberg *Synthworks* series
For Atari ST 1040/Mega ST
From Evenlode
Tel: 099 389 8484
Price from £100

Another well-respected set of synth editors with all the features that one would expect, such as random voice creation. These can be resident with Cubase and if you have enough memory they can be called in via the Satellite linking program.

PROS AND CONS
+ Well established
+ Good features
+ Prices can sometimes be very favourable
– Some of them unhappy with non-Steinberg programs.

C-Lab *Polyframe*
For Atari ST 1040/Mega ST
From C-Lab (Sound Technology)
Tel: 0462 480000
Price £TBA

The concept is of a universal program which allows simultaneous editing and management of sounds from any synthesizer using multiple windows which are also active simultaneously.

The finished music, or noise, can be routed from an overview window. It can also be separated or run together with Creator/Notator or any program that will run with SoftLink. As yet we've not tested it so will skip

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Sequencer/MIDI Software

Voyetra Sequencer Plus Jr. V4	£ 55.00
Voyetra Sequencer Plus V4	£165.00
Voyetra Sequencer Plus GOLD V4	£295.00
Ballade V2 (Now Prints!!!)	POA
MidiQuest Universal Editor/Librarian	£175.00

Music Printing Software

Basic Composer	£ 49.95
Dr T Copyist I (Prints Seq Plus files)	£ 79.95
Songwright 4. (MIDI)	£ 87.00
Laser Music Processor (MIDI)	£149.95
Score (Professional Typesetting)	£649.00
Finale (MS Windows required)	£599.00

MIDI Interfaces

Voyetra V22. (2 in 2 out)	£119.00
Voyetra V24s (with SMPTE sync)	£289.00
Voyetra V4000 (mpu)	£139.00
Roland MPU-IPC (mpu)	£139.00
Roland MPU-IMC (Micro-channel)	£210.00

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Specialists in Music Software

the plus and minus awards but it looks good so far and is planned to work and recognise automatically a wide range of synths.

SYNTH LIBRARIES (VARIOUS)

For Amiga, ST
From Public Domain
Price £2.95 approx.

It is worth noting that there are various Public Domain programs that will voice the most popular synths; e.g. DX7, CZ series. As a cheap and cheerful introduction they could well be your best bet.

PROS AND CONS
+ Cheap
+ Usually have a set of new voices for your synth
+ Sometimes have random voice generation
– Sometimes crash for no apparent reason
– Editing not always available
– Editing is usually numeric and not easy to understand

INTERNAL VOICE PROGRAMS

No matter how good your ideas are, the quality of sound which you are able to produce depends on the computer at your disposal. Only the Archimedes and the Amiga are serious contenders for real sound synthesis at present, although Atari has tried to enter into the spirit with the STE.

There is already one computer, the FM Towns (a 386PC with a CD-ROM drive which is not yet released in Europe) which has several bespoke synth chips on board.

Future computers will doubtless go even further down this road in order to produce the modern micro Holy Grail of true multimedia with music being just one aspect of a standard. PC owners need not feel too left out as they can buy slot-in synthesizer cards from Roland. Expect extensive growth in this field soon.

Chameleon
For Atari ST 1040
From Keynote
Tel: 0761 32610
Price £89.95

A very neat universal editor that can file sounds under their attributes and it runs as a desk accessory. As yet it is only a librarian and not a voice editor but this is under development.

PROS AND CONS
+ Cheap
+ Stores voices as Midi File to load into any sequencer
+ Works with virtually any synth
– Needs min 1mb memory and probably more
–Templates require computer programming knowledge
– Not totally interactive.

Midiman
For All ST's
From: First Rate Ltd
Tel: 0481 23169
Price £79.00

The partner and desk top accessory of Trackman. They will interact when working together but Midiman, like all the universal software mentioned above, will hang around as a desk accessory and work with any sequencer. A very positive aspect is that Midiman actually programs the sounds of the synths and can set up multiple patches.

PROS AND CONS
+ Compartively cheap
+ Runs with any sequencer as desk accessory
+ Many synth templates available
+ Stores all voices
– Cannot store banks of voices
– Template creation needs programming knowledge.

X-OR
For Atari ST, PC, Amiga, Macintosh
From Dr T
Tel: 081 963 0663
Price £175

Uses multiple window environment. Each screen will contain different types of data. Combines powerful library and editing features and can also blend sounds together to form new ones. Will also store data relevant to tuning tables and drum kit settings as well as sounds.

PROS AND CONS
+ Well documented
+ Help line service
+ Full database facilities
– Memory intensive
– Difficult to make your own templates.

DIRECT TO DISK RECORDING

Why bother mucking around with boring old analogue cassette tape, and by doing so losing sound quality when you come to put your master work into playable (and hearable form)? Direct to disk recording is the way ahead in computer music.

The concept is simple albeit expensive; all you need is a high-quality bolt-on sampler and, because the sound is captured at a very high rate (about the same as a CD player), you will also need a computer with massive amounts of memory storage; in other words a hard drive or even CD-ROM. The reason for this is that even recording in mono generally takes some 5Mbs of memory storage, stereo will double this.

You then have the opportunity to edit with greater precision than has previously been possible, using suitable software. You can move elements about, remove sections, cross fade, in fact manipulate the captured sounds in any conceivable manner, all in stereo and ideally using four tracks.

But all this costs money – and lots of it. If you have the loot, it makes for a superb mastering function – not to mention the ability to synch up with video for post production over-dubbing.

All good things come to those who wait though, and it will only be a matter of time before many sequencers, albeit running on micros as yet unreleased, will have this as a standard feature, running alongside MIDI data. We decided to forego the pros and cons here as the systems are fairly equal with the only minus point being the cost.

Genedit
For Atari ST1040/ Macintosh
From Syndromic Music
Tel: 081 444 9126
Price £250/£350

Has a prodigious number of templates which enable it to cover many instruments and effects units; it is easy to create your own and pretty easy to get used to. Will create new sounds easily and all library data can be printed out.

PROS AND CONS
+ Well established
+ Easy to use
+ Good graphics
– Expensive
– No parameter copy functions
– Will only run one editor at a time.

Audio Engineer Plus
For Amiga (requires 1 Mb RAM)
From HB Marketing
Tel: 0753 686000
Price £199

Probably the best sampler about for the Amiga, with superb sound quality and excellent graphics enabling spot-on sample editing to be performed. Loops are easy to create and can be sequenced to produce simple format songs thanks to a 'Multiple Loop Sequencer'. From the same stable as the Audiomaster series.

PROS AND CONS
+ Easy to use
+ High quality sound
+ Many excellent features
+ Saves files in several formats that can be used in other software.
– Expensive.

AMAS
For Amiga
From Microdeal
Tel: 0726 68020
Price £75

Quality sampling and editing plus a MIDI interface which makes it rather a good bargain.

PROS AND CONS
+ Clean samples
+ Comes with MIDI interface
+ Well organised program
– None, unless you think it is too expensive.

Technosound
For Amiga
From Centresoft
Tel: 21 625 3399
Price £34.99

Cheap n' cheerful sampling package that has all the basics including some reasonable editing features and some built-in real-time effects. It falls down slightly in that it only has a smallish sound storage buffer. Good quality for the money though.

PROS AND CONS
+ Price
+ Helpful cassette guidance
+ Easy to use

HYBRID ARTS AN EXPLANATION

Hybrid Arts has no UK distribution at the moment. But here's how to get in touch with the company's European distributors:

Hybrid Technology Computer Systems
Deutschland
GM BH
Eschborner Landstrasse
99-101
6000
Frankfurt Main
90 FRG
Tel: 010-4969 789 2054 or 2057
Michael Von Garnier

THE MUSICAL MICRO...

Home computers are not all equal when it comes to making music. Jon Bates takes an overview of the options...

The Atari ST is still the only computer to have MIDI ports built in. Other machines require a hardware interface that uses one of the expansion ports and has the 5 pin DIN MIDI plugs on it. And herein lies a slight problem, because several interfaces are only compatible with the software from the software house that developed the interface... Early BBC, Commodore and Spectrum music software, like some PC programs is also constrained by this compatibility problem. The PC market does have an 'industry standard' interface called an MPU401 although some care is still needed to avoid falling victim to the dreaded incompatibility problem.

Fortunately the Amiga does not seem to have the same drawbacks; all interfaces so far tested seem to be happy with any software thrown at them. Similarly, the standard Acorn MIDI interface for the Archimedes appears to present few problems. There is music software and hardware available for the Macintosh in copious amounts, most of it American and of high quality, but expect a high price - while the Mac is now much more affordable, software prices have yet to follow hardware prices.

Whichever machine you own - or plan to buy for making music - the choice of interface should really be dictated by the range of software that is available for it. Check out software options before you invest in hardware must be the golden rule!

And if you're setting up a system to a tight budget, bear in mind that bargains can occasionally be had in the 8-bit world - it's sometimes possible to pick up a complete package by scouring the second-hand columns. Start with Shopping Express.

So what exactly are the relative merits of the common home machines when it comes to making music? Here are the options...

SPECTRUM

When it comes to making music the 48K Spectrum is not exactly Mr. Wonderful. Left to its own devices, it generates one channel of sound with only one sound - bleep. Not a lot of good for serious sound creation, but a range of add-ons are available, many of them second hand.

Other minus points include the slowish 8 bit, Z80-based architecture, no built-in MIDI, and a small amount of usable memory. The 128K Spectrum does offer one way MIDI but it is very badly implemented, using a non-standard port which also acts as the printer port. There is a better sound chip in the 128 but that only brings it up to the same standard as the BBC, ST and so on.

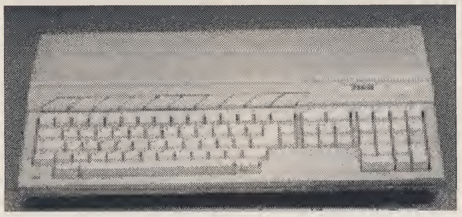
Most of the Spectrum music programs are cassette-based which makes for rather slow working in these dik-oriented day, and there's always the risk of an occasional hiccup in loading. However, despite all these drawbacks, a few years back the music market for the Spectrum was a thriving business – probably for no greater reason than there were absolutely thousands of Speccies on the market.

PROS AND CONS

+ Cheap
+ Possible to get a complete system second-hand
- Interface compatibility problems
- Most software cassette-based
- Hardly the white-heat of music technology

ATARI ST/STE

As a stand-alone music machine the ST is not particularly brilliant. Although there are programs that use the ST's internal chip to create sounds, in the main they are of fun value only and can befound in the Public Domain. The STE, on the other hand, has a much better sound chip, but not much software that supports it directly.



Like many other computers, the ST is able to convert stored sound samples back to sound, and there are a number of samplers available for it. However, it is the only mainstream computer to have MIDI interfaces on board. The advantages of this are that it involves less expense for the purchaser and that there can be no incompatibility worries – all ST MIDI software is bound to run.

PROS AND CONS

+ Built-in MIDI ports
+ No compatibility problems
+ Large software base
+ Not horrendously expensive
- Some programs require hi-res screen and 1040 minimum memory.
- GEM environment can be slow
- Needs lost of memory for serious use

AMIGA

Although it has no built-in MIDI interface there are no compatibility problems with the Amiga – all interfaces work happily with any MIDI software. The internal stereo sound chip is very good at both creating and playing back samples and the Amiga's multi-tasking capabilities can be used to good advantage, allowing you to have several music applications running together.

Initially, the software base was slow to pick up but has now reached quite a decent size with many programs being crossed over from other platforms. The best programs are generally those created specifically for the Amiga. Since it is so capable, many programs use MIDI and internal voices, which allows for a nice cheap way of incorporating samples of your own making within a piece that uses external synths.

The A500 will need some serious expansion though if you want a large number of programs running simultaneously, so you might want to go shooping a little higher up the range if you're really serious about music.

PROS AND CONS

+ No MIDI compatibility problems
+ Excellent internal sound chip
+ Stereo output
+ Multi tasking
- MIDI interface not included
- Will almost certainly need 1Mb minimum memory
- One of the more expensive options

PC

Until recently, at least, the PC has generally been perceived as a business machine rather than as a home entertainment centre. Since music comes under the entertainment label, whether it be for the user or listener, it is not yet one of the PC's strong points in the UK, although there's a lot happening onare front in America.

The American market has always been quite buoyant with music software. The 'industry standard' interface is the Roland MPU401 and its upgrade or clones. This is a very well-equipped interface that not only accepts and works with MIDI, but can also convert pre-MIDI time-clocking systems, known as CV (Control Voltage), by operating on a certain number of clicks per beat. However, it is not cheap – the original interface costs over £250. On the up-side, there are various decent interfaces available for under £100 (make sure the interface is a MPU401 clone though).

PROS AND CONS

+ Rapidly growing software base
+ PCs are very versatile and easy to get hold of.
- MIDI compatibility problems
- Poor internal sound chip
- Interfaces comparitively expensive

BBC

The BBC is not terribly versatile since it has a fairly basic sound chip, but the main disadvantage is its lack of memory - even the souped up versions left little memory for large pieces.

There used to be a program called the UMI 2B resident inside the BBC on a ROM chip, which was very advanced for its time (1985). This was a 16 track MIDI sequencer with the ability to link sections of tracks together to form whole songs. Since it was inside the machine it left the memory free for storing the song data, although later versions also came with memory expansion boards.

The BBC had not an inconsiderable number of MIDI programs designed for it, some of which can still be found - including sequencers, voicing programs and some education software.

There is another solution for the BBC: turn the whole computer into a synthesizer. Hybrid Technology did just that with the Acorn 200 and 2000. The hardware box and keyboard turn the BBC into an eight voice synthesizer in stereo. It has had many devotees, although I wouldn't count myself among them, as it leans too much towards programming rather than music writing. Since so many UK educational establishments have BBCs software is likely to be about for some time.

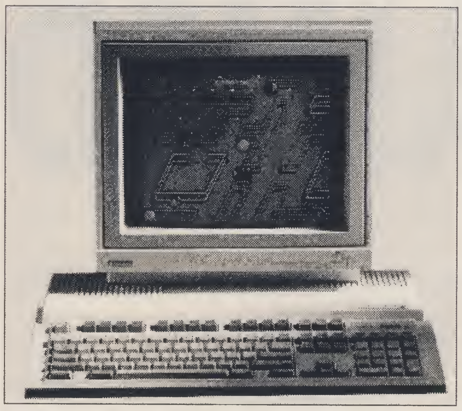
PROS AND CONS

+ Very popular micro
+ Used in many schools
+ Software available although second-hand
- Small memory
- Limited in what it can do
- Interfaces often incompatible

ARCHIMEDES

Acorn's successor to the BBC is a very fast machine which is capable of some staggering musical feats.

The internal chip can cope with eight channels of sound and provides stereo output. Any of the eight channels can be placed in the stereo picture, which means you can pan them from left to right, thus creating a true stereo result as opposed to simulating stereo with left and right channels. The chip is ideally suited to processing sampled sound and most software takes advantage of this. And of course the Archimedes' speed makes it very good at handling large amounts of information -it copes with large musical applications with ease. Bear in mind, though, that early versions did not have a MIDI 'Podule'.



PROS AND CONS

+ Excellent internal sound chip
+ Very fast processor
+ Multi-tasking
+ New models have built-in MIDI interface
- Small software base

MSX

For music, you have to link MSX with Yamaha, who stepped out boldly with the CX5 series of computers that had a built-in sound module based on Yamaha's own world-beating FM synthesis chips. The CX5, now sadly out of production for some years, can with MIDI fitted as standard as well as true stereo output and was accompanied by a plug-in keyboard. Without any additional software the CX5 had a friendly music program resident that you could call up any time.

Yamaha's software has always been ambitious. The company pioneered the first synthesizer voice programmers - not surprisingly, for use in its own synths - and also developed a real-time MIDI sequencer that was reasonable if somewhat sticky on editing and quantisation. It also produced one of the best step-time sequencers. A whole suite of educational software followed; chord finders for guitars and keyboards, advanced single keyboard simulators, voicing software for the internal chip and even more for the MkII version, the CX5 with 128K memory. Some UK software was developed, but like the hardware, you will now only find it in the second-hand columns. It's well worth looking out for, though. The CX5 can be had for a song (Groan - Ed), and is an excellent music machine.

PROS AND CONS

+ Excellent software on plug-in cartridges
+ Good FM synth module on-board
- Early versions didn't have disk drive
- No software currently in development
- Z80-based and consequently rather slow

MACINTOSH

Most professional studios and composers who use MIDI or music DTP are running a Mac. Its speed and the range of machines make it the idea tool to work with. Since the Mac is still an upmarket machine, the software is targetted accordingly – meaning that it tends to be expensive but very comprehensive. However there are now some indications that prices are coming down, as the Mac reaches into the home market.

Sequencers are plentiful, and many of them have software modules that convert the data into high quality music notation as used by music typesetters. If you were going to set up on a serious footing in the music business, the Mac is really the machine to have.

The programs available range from just plain MIDI sequencing and voice programming to direct-to-hard disk recording and film scoring programs with tools that will not only synchronize the cues with the video timecode but will squeeze music cues to make them fit the time available. Seriously heavyweight stuff, and much of it American as you might imagine.

PROS AND CONS

+ Excellent hardware - and the range of machines offers a clear upgrade path
+ Fast processors available
+ Multi-tasking
+ A professional tool
- Still rather expensive
- Not yet a common home machine in the UK

HOW THE COMPUTERS COMPARE

	ST	AMIGA	CPC	SPECTRUM	64	PC	BBC	MAC	ARCHIE	MSX
COST OF INTERFACE	£0	£40+	£50+	*£30+	*£30+	£100+	£25	£99+	£79+	£0
COMPATIBILITY	Y	Y	N	N	N	N	N	Y	Y	Y
LOWEST COMMERCIAL SOFTWARE PRICE	£50	£50	£35	£10	£15	£80	£N/A	£150	£100	£N/A
AVAILABILITY	good	very good	little new	none	good	little new	fair	good	good	none

* No longer produced commercially

JARGON EXPLAINED

Having trouble understanding the lingo which bars your way into the world of computer music? Well, it's explained here.

AFM: Advanced FM

AFTERTOUCH: The pressure applied to a note on the keyboard after it is initially struck. This can affect the tone in many ways, depending on how the sound is programmed and what pressure is put on the key.

AWM: Advanced Wave Memory – Yamaha's own method of sampling and storing sound.

CHANNEL: One of the 16 MIDI transmitting and receiving channels.

COPY: To duplicate a set of events somewhere else in a piece.

EVENT: Any single thing that is recorded via MIDI.

FM: Frequency Modulation – a technique of sound synthesis that combines and modulates simple wave forms to produce far more complex ones. First bought to the fore by Yamaha.

LA: Linear Arithmetic synthesis – using small sound samples combined in such a way that they modulate to form complex and new sounds. Roland pioneered this.

LAYERING: Combining two sounds on top of one another – for example piano and strings. You play a note and hear both instruments.

LOOP: To repeat a piece or part of a piece between specified markers – can also refer to repeating a marked section of a sound stored in a sampler.

MIDI: Musical Instrument Digital Interface – a standard 'language' by which digital instruments, sequencers and computers can communicate. It works on 16 channels simultaneously and translates any action taken on an instrument into a common code.
For a fuller explanation see pages 23 and 24.

MODULATION: Usually said to mean adding another frequency to a sound – it often has the effect of modifying in some way

MULTI-TIMBRAL: Capable of producing more than one sound simultaneously.

PATCH: Can apply to two things. 1) A particular voice on a synthesiser – a 'string patch'. 2) Used on multi-timbral synthesisers to mean a particular pattern of voices pre-set to different MIDI channels and memorised in total as a patch.
The term comes from the time when synthesisers consisted of separate modules that needed to be 'patched' together in certain configurations.

PCM: Pulse Code Modulation. Another method of storing sounds digitally, more often used internally in instruments as a way of storing waveforms.

PITCH BEND: Usually either a wheel or joystick control on an instrument that will raise or lower a note in pitch. The amount of pitch shift is governed by the degree of movement of the control and the way in which the voice is programmed to respond to it.

POLYPHONIC: Literally, 'many notes'. If a tone module is said to be 32-note polyphonic it means that regardless of how many sounds it is creating at any one time the total number of notes it can play for all of them is 32 simultaneously.

PUNCH: To assign a particular section of a piece to be over recorded.

QUANTISE: To 'round up' notes, either in time or another specified parameter – often used to ensure that two parts of a piece synchronise pleasantly.

REPEAT: Any specified part of a piece can be duplicated or repeated a set number of times.

SAMPLER: A device capable of capturing sound, encoding it in digital form and reproducing it – usually offers editing and storage facilities.

SAMPLE EDITOR: Sampled sound can usually be displayed graphically and edited. Usually works with a sampler, or stored samples in a disk library.

SAMPLING RATE: The number of times per second that a sound is scanned and recorded measured in KHz (1000's of cycles per second); in general, the higher the sampling rate the better the quality – and the larger the file required to store the sample.

SEQUENCER: Either software or a stand-alone piece of dedicated hardware. A device that stores and organises musical data in digital form; notes, sound changes and controls among others.
Conceptually similar to a very advanced multi-track recorder crossed with a word processor. Input is either as you play it – real time – or note for note – step time. Often, software sequencers can control the internal sound chip of the computer as well.

TONE MODULE: A synthesiser without a keyboard. Usually multi-timbral.

TRACK: A part of the sequencer assigned to recording and playing back one musical part.

VECTOR SYNTHESIS: The technique of using a joystick controller to combine complete waveforms (usually four) to form new ones. First seen on late sequential instruments, but now also on Yamaha equipment.

VELOCITY SENSING: The ability to respond to the force with which a note is struck – keyboards transmit this information, instruments respond to it.

VOICING PROGRAM: Addresses and 'programs' the sound generating chip directly, either the sound chip in the computer or a specific synthesiser. Often involves the use of a graphic display and usually allows sound to be stored to disk.

ZONE: Usually describes the process by which specified areas of a pitched keyboard can be assigned to different instruments, sounds or MIDI channels.

WHERE TO GO FOR THOSE MUSICAL MUSTS

CASIO: Tel: 081-450 9131

CHEETAH: Norbury House, Norbury Road, Fairwater, Cardiff, CF5 3AS

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FOCAL PRESS BOOKS: Reed Book Services Ltd, PO Box 5, Rushden, Northants, NN10 9YZ. Tel: 0933 58521

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GEM KEYBOARDS: Bluebridge Music Ltd, 3/5 Fourth Avenue, Halstead, Essex, CO9 2SY

KAWAI UK LTD: Sun Alliance House, 8-10 Dean Park Crescent, Bournemouth, BH1 1HL. Tel: 0202 296629

KORG (UK) LTD: 8-9 Crystal Centre, Elmgrove Road, Harrow, HA1 2YR. Tel: 081-427 3397

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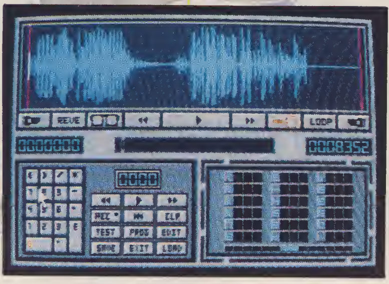

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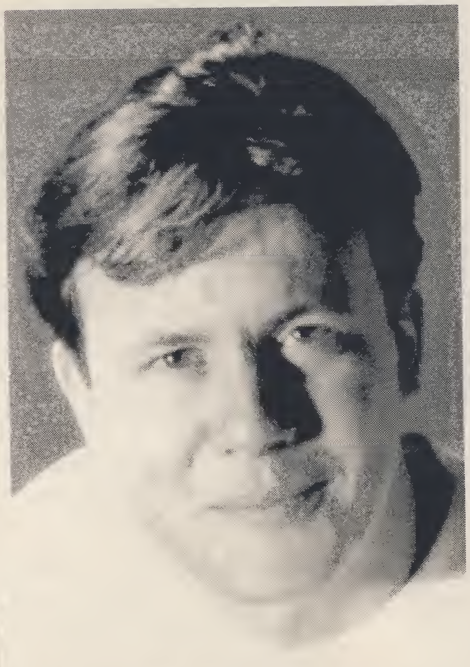
IN SEARCH OF CHART SUCCESS...

So you've produced a stunning piece of music – what do you do with it? Apart from touting a tune around the record companies, there's always the option of selling it to a game publisher. But what are they looking for?

The Bitmap Brothers made quite a stir when they entered the games market – apart from the fast 'n' furious arcade action they offered the joystick-wielding public, Bitmap games offered a little extra in the music department. Suddenly chart stars were providing tunes to accompany the sprites... Maybe this could be another route to fame and fortune for a composer equipped with a computer? *Express* asked Eric Matthews, a brother Bitmap, what the score was...



Eric Matthews: "More and more, music is becoming a valid part of the computer publishing world..."

Ever since *Space Invaders* was first written for the ZX81, pundits have been drawing parallels between the games industry and the pop business. And like parallel lines, the two industries have never quite managed to meet. Sure, Virgin launched its own software label. Sure, the odd popster dabbled an experimental toe into programming – like Pete Shelley and the man who hides behind the Frank Sidebottom mask. But mass-market music and shoot 'em ups never really mixed.

But the Bitmap Brothers have teamed up with record label Rhythm King to set up a games label – Renegade. Now that the music publisher behind such acts as *Betty Boo* and *Bomb The Bass* is on the scene, is music for the home computer about to find chart success? *Express* asked Eric Matthews about the future of 16-bit music...

Express: If someone wanted to send in a piece of work for possible inclusion on a Renegade game how would they go about it? What format is preferable?

EM: Well opening sequences for games are the places where music is at its most obvious, so a short, maybe two-minute, sequence is a good way to get an idea of a person's output. Short samples are better than great long repeating chunks – in fact we are trying to get away from the irritating loops of music which have tended to be associated with games.

Express: And which are the best machines when it comes to playing a mean tune?

EM: Well, obviously the Amiga. The ST can be a bit of a pain because getting good samples into it tends to slow the game down. And the Sega MegaDrive and the Nintendo system have really good sound chips as well.

Express: Why the Amiga?

EM: Basically because it has such an excellent sound chip – it's very nearly a synthesiser in its own right.

Express: Do you actively encourage submissions from the public?

EM: We're not *really* set up for that kind of thing. We tend to use professional musicians for soundtracks, and now that we are working with Rhythm King the options are even wider.

Express: What kind of reaction do you get from 'pop stars' when you include their music in a game?

EM: Mostly very positive. Our next release, *Gods*, includes music composed by *Nation 12*. I remember John Foxx coming in and looking at one game running on the Amiga and being amazed.

Musicians seem to have the idea that the sound with games is just beeps and whistles – so when they see and hear something like *Speedball 2* running, the reaction is normally: "Wow! this is just the same as a high quality recording!"

Express: So could you see music becoming more important in the computer industry?

EM: When we used *Bomb The Bass* on *Xenon 2*, the soundtrack alone got an amazingly good reaction from the public. It's clear that if you use quality sound tracks on quality games, the combination has to be excellent. But there's more that can you do with music – we want to start using music more for atmosphere. It would be nice to use a soundtrack that tied in with the graphics.

Express: Like film music?

EM: Yes, very much so. We are trying to tie in a soundtrack with changes in action and graphics. But I don't really want to go into it too much now...

Express: Would it be possible, in a graphic adventure say, to have the backing track change when a character picks up an object or changes room?

EM: That kind of thing, yes. Basically it would be good to move away from the boring old repetitive sounds.

Express: Bearing in mind the way film or TV soundtracks can cross over into the pop world – like the *Twin Peaks* theme – could you see a day when a computer game sound track might make it into the charts?

> **"...it's funny that you should say that, but we had thought of remixing the *Speedball 2* theme and releasing it as a single in the future..."**

EM: It's funny you should ask that but we had thought of remixing the Speedball 2 theme and releasing it as a single in the future.

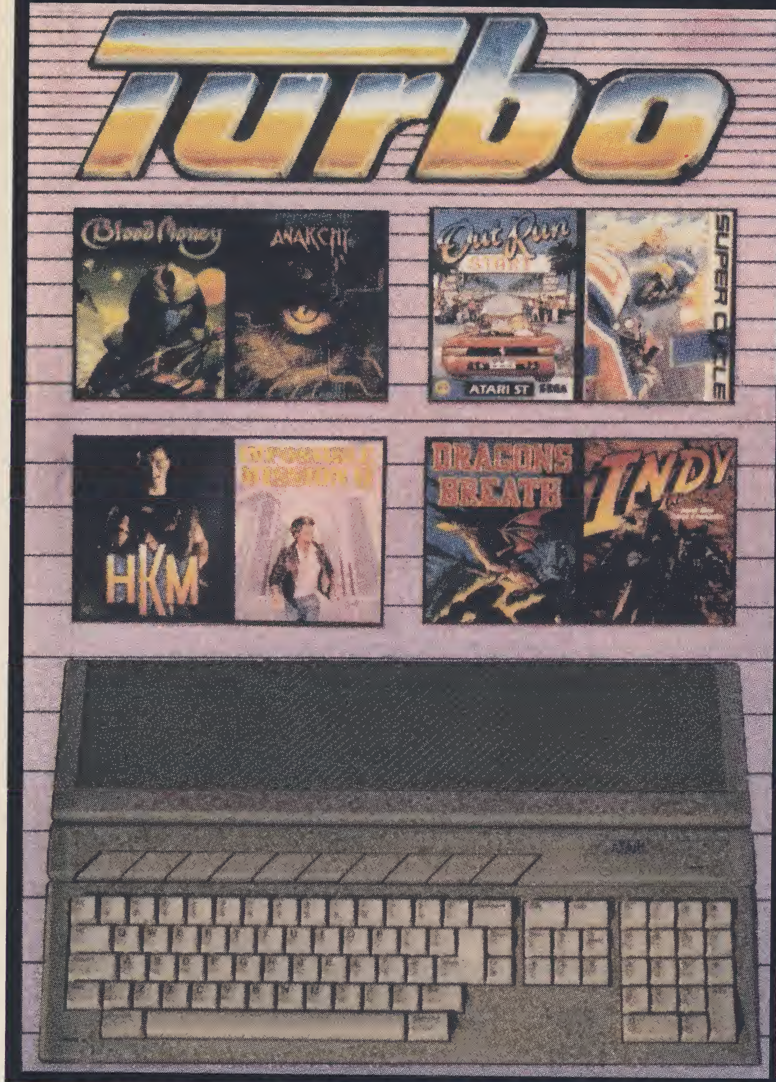
Express: So music is becoming more important to games, and we could see computer game musicians making it into the mainstream music charts?

EM: One day, definitely. Yes.

It's happening in Japan with CD remixes of console game soundtracks. And what happens in Japan today happens over here the day after tomorrow. Dust down your sampler and get sequencing!

ATARI ST

"E" & "FM"



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AMIGA ADAGIO

Damien Noonan takes a close look at the Amiga's musical potential.

The world of Amiga music is actually quite simple, although it can at first sight seem rather complex. It is also very enjoyable and rewardinle, although it can at first sight seem rather complex. It is also very enjoyable and rewarding to get into, even if it's only at the level of buying music demos from a PD library and whacking it through your hi-fi – remember that the Amiga produces full stereo sound and has ordinary phono outputs, so all you need to hitch it up to the sound system in your living room is a phono lead, as supplied by any hi-fi shop.

Down to the nitty gritty. The Amiga's capabilities when it comes to sound-making, rather like close encounters, split into three obvious kinds – creating, recreating and organising sound. You could look at these as the three Ss – synthesising, sampling and sequencing.

THE FIRST KIND...

Ok, so let's cut the simple stuff and get into a bit more detail. The first of these ideas, creating sound, is mainly concerned with the Amiga working entirely on its own. The Amiga has a dedicated soundchip called Paula, which is in effect a synthesiser in itself. All you have to do is listen to the kind of music written to accompany Amiga games. This is exactly the sort of thing that Amiga music of the first kind involves – the Amiga, on its own, playing music. There are packages available that will help you write music for games. There are also programs that will allow you to make music just for the sake of it, but still involving nothing more than the Amiga – no instruments, no expensive equipment.

THE SECOND KIND...

Amiga music of the second kind also is based around a capacity of the machine itself. The soundchip is blessed with another very advanced ability, the ability to convert sound from a digital form to an analogue form and vice versa. For anyone not familiar with these terms, analogue sound is the kind of stuff our ears actually hear. Let's take a moment for a simple explanation.

The loudspeakers of your hi-fi system or your ghetto-blaster work as follows: an electric signal makes the speaker vibrate, pushing the air in front of the cone out in waves. Your ear works almost the other way round – the waves of air push your eardrum backwards and forwards and this movement is converted into what your brain perceives. So sound is no more than vibrations of air.

OK, that's 'analogue' sound. Note that because the air is moving forwards as it is pushed along by the speaker it moves in waves – very much like waves in water. The closer together the waves are, the higher-pitched the sound is. Equally, the further apart they are, the lower the sound.

The number of waves there are in a given time is known as frequency, usually expressed in waves (or 'cycles') per second – or 'Hertz'. A low-pitched bass sound may be as little as 7 or 8 cycles per second (7-8Hz), while a treble sound may be as much as 17,000 cycles per second (17KHz). The highest sound the average adult can hear is about this level.

DIGITAL DYNAMISM

So, what about digital sound? Well, digital is the system used by Compact Disc players. The sound waves are sliced up into bits. You can think of it best as a graph. If you drew a curve going up and then down again on graph-paper, that's like an analogue sound. Alternatively, you could plot it as a series of points and deduce the shape of the full curve from where the points are. That's how digital sound works.

Now back to the Amiga. In order to make a digital sound audible, it must be converted to analogue before being passed to the speakers. The Amiga's soundchip contains a digital-to-analogue (or D-to-A) converter which does this vital job. Now obviously this doesn't make it into a CD player. What it does do, however, is open up the whole world of sampling. Sound can be fed into the Amiga from any analogue source, be it a microphone, tape, CD, record deck or video recorder and sliced up into digital information. As digital info it is in effect just like computer data and can be stored on disk.

Sampling is how the Amiga makes sound of the second kind, recreating sound from the environment around it. Samples can also, just like the Amiga's own synthesised sound, be made up into complete tunes or incorporated into music. There are pure sample players around that can write tunes from samples – for instance, by pinching a drum track from one place, synth sounds from another place and vocals from somewhere else. And remember, too, that even hit records nowadays, especially of the Acid House kind, do it this way.

THE THIRD KIND...

Our close encounter of the third kind with Amiga music takes the form of organising sound. This is simply another way of saying you can write a whole tune using your computer. 'Sequencing' is the most obvious form of this: a tune is broken down into a sequence of 'events', such as a drum beat happening every so often, a bass punching out notes every so often too, and so on. If you think about it, the idea of music as a sequence of events is perfectly logical – all traditional written music works on the same principles of when something happens, what that something is and how long it happens for.

Sequencers tend to work on the same principle as recording studio tape recorders do – generally they have a number of tracks with one instrument being played on each track. The concept is really very simple.

INTRODUCING MIDI

The term MIDI will crop up an awful lot in any discussion of music. MIDI is the Musical Instrument Digital Interface, a standard code by which all electronic instruments, such as synthesisers, can be made to operate.

All you have to do is buy a MIDI interface for your Amiga, a fairly simple gadget costing as little as £20-30. With this you can then control most electronic instruments. Instead of having to play them, you can now control them from the Amiga. You could write a song using a sequencer package on the Amiga and just sit back and let it play the song using as many digital instruments as you have space for.

Damien Noonan edits Amiga Format *magazine. These extracts were taken from his book* Getting the Most from Your Amiga, *available from Future Publishing Ltd, The Old Barn, Somerton TA11 7BR. It costs a very reasonable £9.95.*

Recommended software

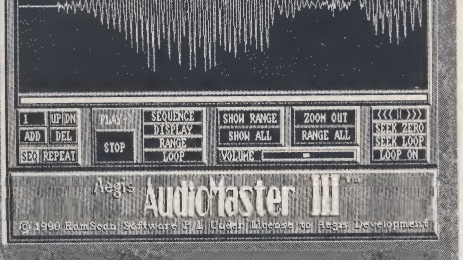
As we have seen, the Amiga is just bursting to make music. In terms of hardware it's an excellent option. But what about the software to match it?

First, and maybe surprisingly to some people who never bother with anything under £30, you should look in the Public Domain. Here you will find cracking demo tunes to show you what is possible, such as the Titanics Acid House disk, which is practically an album on a floppy. Also available to the seeker of qulaity bargains, here too you will be able to get whole sample sequencers which you can then use to write your own Amiga-only tunes. There are many ready-written songs lurking around too.

For games writers who don't have a music expert to help, *TFMX Soundtool* (£44.95, The Software Business) is a good bet. Elsewhere among simple beginners' programs, *Sonix* is very good if you can get it (Aegis, about £30), especially because it displays tunes in music notation, so you can type tunes in from sheet music.

Samplers are a combination of hardware and software and currently the best software around is *AudioMaster 3* (Oxxi-Aegis, varies with hardware deal). It can be bought hand-in-hand with lots of different hardware, but the best (and most expensive) is the *Audio Engineer* package (£199 from HB Marketing).

At the serious end of MIDI sequencing, *Music-X* (The Software Business, £129) has made a very strong bid to establish itself as a standard. It hasn't quite managed it against intense competition from a number of other decent sequencers, but it is good.



• *Audio Master III, highly rated.*

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PACKAGE IDEALS

Jon Bates looks at hardware set-ups from the humble to the ultimate dream machine.

The prices used are the manufacturer's recommended ones, but a few hours spent window shopping around, scanning adverts, plus the odd phone call may well turn up keener prices, particularly if you are buying more than one item for cash.

Whatever system you choose it should be something that you feel you can get the best out of, and that is open to upgrades and improvements.

MIDI is going to be mentioned a great deal (for explantations of these jargonese terms turn to glossary the on page 30). This has now become the standard system for computer music; you can view it as being equally as important as an operating system such as MS-DOS or TOS. As with any O/S, MIDI is being constantly reviewed and improved. However, once your computer has MIDI capability you are set up for years of music-making.

And the beauty of MIDI itself, and in fact any MIDI music system, is that you can add to it without having to throw anything away through obsolescence.

Package 1

EVS-1
FROM Sound Technology
PRICE £299
PLUS
PC-200 MIDI keyboard
FROM Roland
PRICE £175

Instead of using one instrument to carry out all of the work we could have a separate MIDI keyboard in tandem with a tone module. In this case the tone module is capable of producing more than five voices at one time.

The EVS-1 tone module from Sound Technology - a company which has gained some renown in the rising world of computer music, is an amiable and workman-like beast, and at just under £300 it is quite a good bargain, offering plenty of ways to create sounds with 24 bit clarity. It is also able to play 16 notes simultaneously as well as eight different 'sounds'.

ST owners (and bear in mind that many of your favourite stars – OK and the ones you hate as well – use STs) also get a voice programming and librarian disk. This can come in rather useful as, apart from 80 preset sounds and two drum kits which are available, you can program 20 of your own sounds in too. Combine this with a remote keyboard from Roland, the PC-200, which will set you back £175. This keyboard will control pitch bend, MIDI patch change, and is velocity sensitive. Total bill is £475, just within budget.

CONTACT DETAILS

Roland (UK) Ltd
Atlantic Close, Swansea Enterprise Park, Swansea, West Glamorgan SA7FJ
TEL: 0792 700139. NB. Roland also handles the Boss range of effects unit.

Sound Tecnology,
Letchworth Point, Letchworth, Herts SG6 1ND
TEL: 0462 480 000

ULTRA LOW COST

Under £500

Let's face it, £500 is a lot of money. You have probably already spent that just buying your computer. So, is it possible to set up for less than this? Well, the good news is – yes.

My first stop would be to buy one of the many single keyboards that proliferate in the market. Obviously it would have to be equipped with MIDI otherwise you are really wasting your time. The bottom line is that these dinky things are in effect multi-timbral modules. They can usually be addressed on about five channels of MIDI simultaneously since in their normal life as a self-accompanying keyboard they need to generate this many sounds, including drums, at the same time. Thus in one box you get a keyboard that can input notes, as well as a basic, but sufficient, tone module.

The second-hand market is rife with these instruments but you will need to have a rough idea of what you want. The deciding factor comes when you audition the sounds. A point to bear in mind is that the sound is often emerging from rather inferior speakers within the instrument and could improve with decent amplification.

Favourites to look out for second-hand are the Yamaha PSS480 and 680 both of which have a pretty decent set of voices. These should come in at about the £200 mark at the most.

What follows is a quick look at the most prominent models – there are many others.

SINGLE KEYBOARDS

PSS 590
FROM Yamaha
PRICE £149.99

A good basic instrument with a four octave mini keys, 28 note polyphony, 100 sampled voices. For those budding popsters, percussion makes this one of the best bargains around for the beginner.

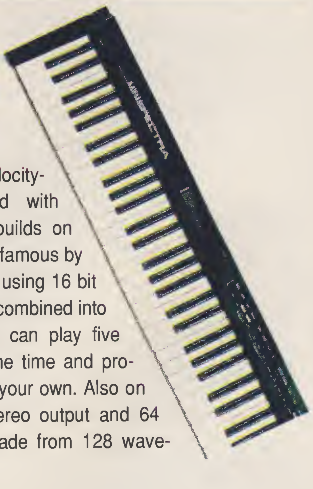
PSS 790
FROM Yamaha
PRICE £229.99

Specifications are the same as the 590 but an extra octave of keys has been added. There is also the option to create your own sounds and blend them thanks to the joystick control. It also has a pitch bend wheel so you can bend notes to your heart's content and have the sequencer faithfully reproduce them. You can also dump voices via MIDI.

PMP-700
FROM Casio
PRICE £349.99

Five octaves of full-size keys, sound editing plus digital reverb. You have a respectable 200 sounds to play with plus five channels of decently-specified MIDI. The ubiquitous pitch bend wheel is also included.

SPECTRA KC10
FROM Kawai
PRICE £450



Five octave velocity-sensing keyboard with pitch bend that builds on the sounds made famous by Kawai's K4 synth using 16 bit samples that are combined into new voices. You can play five sounds at any one time and program up to 32 of your own. Also on the menu are stereo output and 64 preset sounds made from 128 waveforms.

CONTACT DETAILS

YAMAHA KEMBLE MUSIC (UK) LTD
Multikeyboard Division
Mount Avenue, Bletchley, Milton Keynes, Bedfordshire, MK1 1JE
TEL: 0908 371 771

CASIO
Unit 6, 1000 North Circular Road, London NW2 7JD
TEL: 081-450 9131

KAWAI (UK) LTD
Sun Alliance House, 8-10 Dean Park Crescent, Bournemouth BH1 1HL
Tel: 0202 296629

LOW COST £500 - £750

The next step up the ladder gives us a little more flexibility; a more powerful synth or tone module with remote keyboard. It goes without saying that you can perm any two from the 'packages' I have suggested. One good suggestion would be to shop around for a second-hand DX7 - the synthesiser which launched a thousand singles. Although not multi-timbral it has more voices available for it than any other synth. You should get an old one now for about £400 and they make very good master keyboards that also create sounds that can still cut it with the best.

PACKAGE 1
£544
ROLAND CM32L £369
PC-200 keyboard £175

Roland have made their neat CM range of multi-timbral modules especially for use with computer sequencers. They fit neatly under the monitor and come in three varieties. This package uses the CM32L – 8 LA synthesized voices plus PCM drums simultaneously. The PC-200 keyboard provides the pleasure of 32 notes simultaneously.

As a word to the wise, I could have chosen the CM32L's stand-alone equivalent, the MT32, which is about the same price nowadays.

PACKAGE 2
£674
YAMAHA TG33
ROLAND PC-200 keyboard

The TG33 is the all new and improved modular version of Yamaha's successful SY22 synth that uses Vector Synthesis to create sounds. 128 sampled waveforms and 256 FM waveforms combine to produce stunning effects.

At your disposal are 32 notes on any combination of 16 MIDI channels, although this diminishes the more complex sounds you create. The controlling joystick on the module combines different sounds to produce an almost infinite variety. If you tire of that there is a random voice-creating function plus 16 on-board digital effects. All this for £499 plus £175 on Roland PC-200 keyboard described previously.

Package 3
£744.95
ROLAND CM32P
CHEETAH 5V KEYBOARD

The CM32P is from the same series as the 32L described above, but offers sampled voices and enhanced percussion – 32 notes, 8 voices plus drums all at one go for £445.

The Cheetah 5V has the advantage of 61 full-sized keys, 4 independent MIDI outputs (for expansion later), 8 definable key zones, MIDI effects, three definable controller wheels, velocity and release sensitivity (no aftertouch though) and 80 performance memories all for £299.95.

MEDIUM COST
£750 - £1000

Even more choice for the discerning buyer. For example you could beat Yamaha's SY22 which retails at £799 by combining the TG33 with the Cheetah 5V keyboard, thereby getting full size keys with lots of control for 5p less (although you might lose out on Aftertouch).

A little more shopping around and you should turn up the rather specified Korg M1 within this price range; this little baby comes with the ability to produce 8 sounds simultaneously that you will love as soon as you hear them because they've been used on virtually every record this side of 1988.

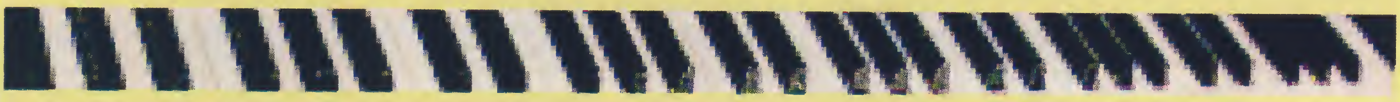
Also into this price range goes the Roland D series of synths, although the D50 is not really worth having as it is not overtly multi-timbral and the new D70 is holding its price tag.

Package 1
£964
ROLAND CM64
PC-200 KEYBOARD

Put the Roland 32P and 32L in one box and you get the CM64, which costs £789. 15 MIDI channels and 63 notes simultaneously plus digital effects. Throw in the small keyboard, plug it in and have over 230 sounds to go at. All the Roland modules can be programmed from voicing programs like the Gajits range.

Package 2
£974.95
CHEETAH SX16 SAMPLER
PC-200 KEYBOARD

Now here's a thought; Cheetah sell this budget sampler at £799.95. Its half megabyte memory can be expanded up to 2Mb. It has eight polyphonic outputs, up to 48Khz sampling rate and despite some quirky editing it ain't half bad. What's more it reads sample disks for the popular Akai S900/1000 range. Put the PC-200 keyboard, or any low priced MIDI keyboard with it and you have a very versatile system indeed.



HIGH COST £1000 - £1500

Now we are starting to get serious about our music. The bottom end of the true giants amongst synthesisers start within this range and you may well be tempted to save up and splash out for some high-quality hardware.

Needless to say the choice is wider as well since you can pick and mix various items that we have already covered: for example adding a TG33 to the Cheetah sampler. It is always a good idea not to go for two instruments that create sound in the same way – say a couple of LA Synthesis synths.

They may well be different in specifications but there is a familiarity about the sound; variation is the spice of sound. Herewith are various items that you might consider if this is your price bracket.

£1399
GEM WS2

This is a real turn up for the books. Gem has been known for years for turning out chintzy-sounding naffish keyboards that look great when you decorate them with dahlias. But the WS2 is a complete departure. Spawned from their acquisition of a chip factory back in Italy they have come up with a self-contained single keyboard that has a demonic selection of sampled voices that you can change at will. Although it would appear at first that you can only have five channels of MIDI, you can in fact assign more sounds to each channel and either zone or layer them. In fact it has full MIDI specifications plus internal effects – lots of them that you can set up for each MIDI channel independently. It also has a good keyboard and pitch/modulation trackball. If you can't work out how to dump the patches and voices via Systems Exclusive then an extra £299 buys you a disk drive for it.

£1499
ROLAND W30 WORKSTATION

Basically it's an S330 sampler bolted on to a keyboard. The sampling side is extremely competent: Half a megabyte of memory with filtering, sample editing, layering, velocity setting and floppy disk storage.

It can hold up to 30 seconds of samples in total, but the clever internal architecture means that you can get far more out of it than it would first seem. Eight multiple patch settings, full MIDI control plus a decent keyboard all under one roof.

£1050
YAMAHA SY55

This is a synth with full multi-timbral capability that uses AWM (Advanced Wave Modulation) samples to create its sounds in several ways; 64 permanently on board with 64 to load in plus 32 multiple memories. Add to this a module like one of the Roland CM series, an EVS1, or Yamaha's own TG33 and you have a fairly formidable set-up complete with controlling keyboard to boot.

£1575
KORG WAVESTATION

Just outside our upper limit but still very tempting is the Wavestation. In quite a lot of respects it is like the older analogue-style synths. It uses vector synthesis which allows great scope for experimentation and produces some incredibly complex sounds quite apart from the usual ones.

As a multi-timbral synth the Wavestation is more than adequate. Its keyboard is perfect as a master controller as it can transmit on up to eight channels simultaneously all set up in layers or zones. With a total of 365 sampled waveforms sealed into its ROM it can store 105 single voices and 150 combination voices.

It can play 32 notes simultaneously via all 16 channels and your sequencer will remember the real time changes that the joystick control makes when you are mixing and creating sounds, thanks to the full use of the MIDI language. Extra memory and waveforms are available on cards. It is a unique and amazing instrument the options of which would take an age to exhaust.

£LOADS

THE ULTIMATE SYSTEM

First of all you need an array of multi-timbral modules to cover all eventualities. These will need to have varying methods of sound creation for the widest possible scope. To this end you could take in the TG77 Yamaha module – the rack mount version of the SY77 flagship synth. This offers eight individual outputs and 11 different methods of sound creation using samples, FM (advanced), and permutations of these two methods: Sounds stacked on top of one another and sounds created by taking slivers of one sound modulated by another.

Needless to say it has card slots and a disk drive plus full on-board effects units. Although horribly complex to program, it has the ability to mimic virtually any other synth. With its full potential yet to be explored I predict a considerable shelf life. A couple of these will do nicely at £1,299 each.

Keyboarding

The main keyboard could be the Korg T1. A full 88 notes weighted like a piano but with velocity and aftertouch sensing. Since it is a full-race synth in its own right with very capable MIDI features it has a whole host of excellent Korg-type sounds on board, all of which make it an ideal controlling instrument. It can also accept samples from any other sampler capable of dumping them in MIDI format which will make it ideally suited for live work.

For the real fat analogue sounds why not add one of the Midimoogs – in reality just an old Minimoog retrofitted with MIDI and rack mounted to save on space. Just to add spice to this why not add the MIDI'd up version of the Prophet five – a synth with a unique fat sound much used in the mid-70's.

Sampling

Samplers are essential for any serious system. I recommend two options here: Rolands' new S770 has enormous potential not only for sampling and sample playing but for creating totally new sounds from the samples. An onboard hard disk aids storage/retrieval size and speed; both CD ROM and magnetic/optical disk units are optional extras. Its memory can be expanded from an initial 2Mb to 16Mb. This little lot will set you back about £15,000 including the colour monitor to edit with. The alternative is the Akai S series which will probably work out at around the same price for the same facilities.

Although most people buy samplers with the intention of creating many of their own – for samples of 1960's 'cult' TV shows or even Magaret Thatcher most professionals rely on the CD or disk libraries specially created for the sampler market.

It takes a long time to get samples sounding exactly right and this justifies fitting a hard drive to the samplers. If you have several banks of samplers a read/write optical disk is a must since it will take some time to stuff the many megabytes of sampled sound into the samplers.

Recording

There is but one option – hard disk recording. The Digidesign *Sound Tools* system running on the Macintosh would fit the bill as we can also link it up to other devices such as videos and multi-track machines to give a complete time locked system. By using samplers and direct-to-disk recording, songs/music cues and dialogue can be shuffled about – compressed, expanded, and lined up – with ease.

The *Sound Tools* system runs on a Macintosh and to make things work efficiently you will need an access time of better than 28ms. If you consider that one minute of stereo recording eats up 10Mb of disk space you are going to eat your way through rather a lot of memory pretty fast. Back-up systems are a must.

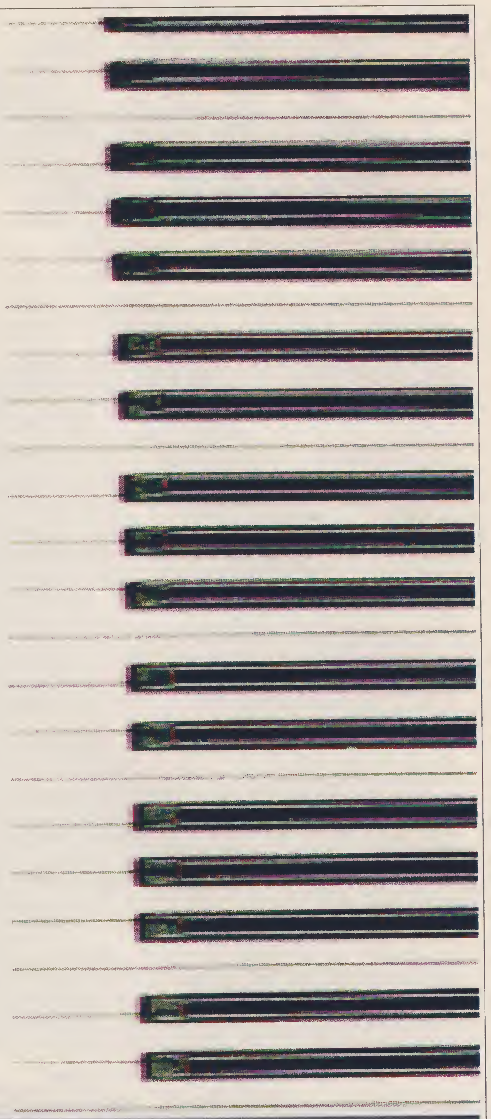
Maybe you might be better off running two computers in tandem – say a Macintosh for the digital recording and an ST, another Mac or Amiga for the MIDI side, and then just synch them together. However, we have spent a lot of dosh just on this alone. Forgetting the cost of the micros, there is still about £10,000 to find and our overall bill is getting near the £100,000 mark.

The Big Guns

So why not forget the bits and pieces and really go for broke in one spree. How about a machine that can create and store all the voices and samples you want, running 96 sounds simultaneously from a 200 track sequencer, and keeps 396 voices at hand and 128 MIDI channels in command at all times. Couple this with a built-in digital mixing desk to record to disk.

Now for some storage. 16 640Mb hard drives should do, enabling us to have a two hour 16 track digital master stored and then mixed down to digital stereo. All this is quite apart from the 320Mb systems disk and 30Mb hard disk needed to just get it running. You will also need a keyboard, and maybe a few hours of instruction. If you already have all this then you've spent a shade under £400,000 on a Synclavier 9600!

system with a few additional extras – but not all of



• The Synclavier. £400,000 worth of dedicated music hardware and software, which most of us can only lust after.

OF MUSIC AND COMPUTER FAIRS

Now that computers and music are firm companions we look at the cross-over which occurs at annual industry events.

Oddly enough, the gap that at one time formed a clear division between a computer fair and a music fair is now closing fast. At many computer shows there is a fair size area devoted to showing off the latest music software, often in association with the latest synths and tone modules. The converse is also true of music shows; many stands are taken up with software companies promoting their latest wares.

Although there are a large number of fairs in the UK, it would be true to say that quite a few of them are a reasonable excuse for an indoor market where the idea is for the stall holder to shift as many boxes of merchandise as possible. For the punter this often offers quite a good deal as the prices, particularly on the afternoon of the last day, are usually very competitive. However, there are really only a few fairs that the manufacturers and software houses target to launch new products. It is on these that we will focus our attention as to keep abreast of the tidal wave of innovation this is where you need to be. You will also find that these fairs attract the press merchants, like myself, who will duly report the unveilings in *Express*.

The prime show in the UK is what used to be called The British Music Fair. This annual bun fight is usually held at Olympia in Kensington around about mid-July. According to the press release, the fair continues to grow in stature and size; so much so that this year it has been decided to widen its scope. It will now include the rest of the world and, "embrace any product or service including warbling Christmas cards, singing strippergrams and trained canaries".

Joking aside, the show inevitably has quite a few firsts on display in both music hardware and computer-related products and software. This is because it is perceived by many international companies as a very important market and one that is densely populated in terms of computers and electronic instruments per head. The hardware tends to be exhibited by the manufacturers themselves and not the shops or dealers, although some of the main importers will have a stand with areas dedicated to brand names. Software is usually on the importers' stands and often two or three software companies will be represented on one stand, except for the larger European and UK software houses.

Perhaps its main drawback is that it is staged in London – very handy for most of the exhibitors but a real pain if you have to travel there. Even if we take someone travelling from somewhere in the middle of the country, say Sheffield, a one day visit will work out rather expensive. You will need to catch Inter City trains at their premium rate (unless you want to arrive after mid-day) and that will probably only leave you with about six or so hours there. That might sound a lot but in fact it will soon disappear. Add to this the entrance fee of about a fiver, the rather over-priced and inadequate catering facilities, and it might be a bit off-putting. To test the theory of this, there was a second music fair staged in Manchester last November which proved to be quite successful. Although by no means the size of the London version it did, nevertheless, attract over 6,000 visitors. With the introduction of a special Education day this year a regional show would have been just the thing: imagine herding form 4B from Euston to Olympia and back and you'll get a rough idea of why.

> **The British Music Fair will embrace any product or service including warbling Christmas cards, singing strippergrams and trained canaries.**

This year's show runs at Olympia from the 10 – 14 July. The first two days are for trade preview so unless you have a trade ticket, hard luck. Friday 12 is the Education day and Saturday 13 and Sunday 14 are public days.

The largest music fair is held in Germany; in Frankfurt to be precise. This yields an unbelievable number of exhibitors – well over 900 – in three vast halls, each usually having several levels. These are just three out of the 10 exhibition halls that make up the Frankfurt Exhibition Centre. Every software house that produces music software is represented, each usually with its own stand. It is interesting that there is quite a lot of software from both Europe and America that is simply not available here, usually because there is no importer.

Apart from that it is the show where exhibitors try to outdo one another, making a great effort to have the new products up and running. This can, of course, lead to what is known in the trade as 'vapourware'. You see it at the show and the next time you see it is at the same show the following year – still in the development stage. This is something of which to beware. Quite often the soft or hardware on display is a prototype only and the time lapse between seeing it demonstrated and having it on your screen is considerable. The major manufacturers try to avoid this, but there again they can often afford to wait, whereas the smaller software house will need to drum up interest in their product, even if it is not quite 'idiot proof' yet.

Obviously with such a vast exhibition you will have to define your areas of interest. If electronic drums are your mainstay then you will want to visit the drum department with a map of exhibitor stands grasped firmly in your hand. Catering and other facilities at Frankfurt are wonderfully efficient and faultless, with a restaurant on each floor and several permanent snack bars and rest areas on every floor. Moving walkways take you from area to area and there is every facility you could wish for, including an inter-denominational chapel!

For the UK punter, the problem is that Frankfurt is not exactly next door. Standard air fairs are outrageous – about £350 return and £120 if you book 7 days up front – and hotel prices are not cheap – around £70 per night per head. However it is possible to get around this by finding a hotel that books the room regardless of the number of people it has in it, and then picking a flight from one of the bucket shop offers.

On recent enquiries these work out at between £76 and £89 return which is a considerable saving. The catch is that you will have to fly from Gatwick and so you will need to add on the cost of getting to the airport and back. The Frankfurt Fair is on March 2–6 with the public days being Saturday March 2 and Sunday March 3. On top of all that you should add on the cost of eating (slightly higher than over here) and admission which is about £8 per day, £4 for students.

Are these fairs worth going to? If you are in anyway associated with the music or music software trade, the Frankfurt Fair is definitely worth a visit. There are products that demand a market in this country and you could be the person to capitalise on this. The London show is essential for any self-respecting computer musician or any one with an interest in making music.

More details on these fairs from: International Music Show (London) : Westland Associates 071-730 7852 and Frankfurt Music Messe: Collins and Endres: 071-734 0543.

MIDI Music Show

The MIDI Music Show on April 26-28 at the Novotel in Hammersmith brings you the perfect opportunity to see, hear, touch and use all of the products that you are now reading about.

The show, sponsored by *Making Music* magazine will have over 100 companies showing the latest keyboards, software and all other products.

The extensive seminar programmes, which are free of charge to all visitors to the show, will cover a range of subjects suitable for both the beginner and the expert. For more details contact Westminister Exhibitions on 081-547 1183.

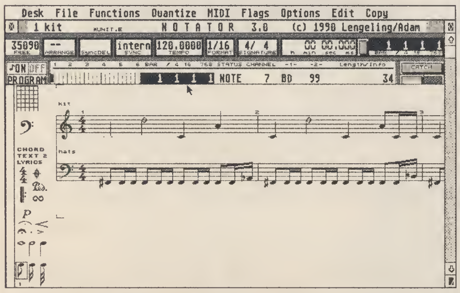
HOW THE MICRO

As the micro has expanded in every conceivable way, the music facilities have also swelled. Essentially there are two ways to make a micro work musically. You can use the internal chip or you can get it to control an external sound generator like a synthesiser...

At first, the tunes and effects that computers generated were primitive to say the least. That is, until the rise of the specialist music programmer. Armed with his carefully guarded and usually self-written 'player program', the games music programmer was able to turn the internal chip on its head. This, then, is the basic way to make your micro musical: poke the internal chip until it bleats.

There are not that many internal sound chips around. The most common is a direct descendant from the first generation of arcade games. It is the AY 8912 or clone. This chip has seen the insides of many a computer: BBC, Amstrad CPC, IBM PC, Atari ST, Spectrum 128, MSX, Dragon. However for each of the aforementioned machines there are programs about that allow you, the user, to play around with its capabilities, including the three channels of sound, any of which could be chosen to generate noise. There were even bolt-on boxes containing this chip for the musically moronic Spectrum 48 with its woeful 'beep' command. More adequate was the Commodore 64 which had a specially designed SID chip. The sound was a little more varied with four channels to go at, and the filters – those devices that clean up the sound – were certainly more effective. Hence the games had much better soundtracks. The real breakthrough with the 64 came with the realisation that digitised sampled sound could be stored and played back through the chip.

The best computers around at present for making music internally are the Amiga and the Archimedes. Both these machines have specialist custom-designed music chips. The Amiga is more established in the market and its stereo sound chip is capable of playing back sampled sounds. A program that has a library of sounds to go at, and that is capable of using those sounds to create a tune will sound pretty good. The Amiga stores its sound in common formats that can be used by other Amiga programs. The specs for the Archimedes are even better. An eight channel internal chip, a similar ability to play back sampled sounds with good fidelity, but it can handle more sounds simultaneously. As yet though there are few programs on the ground for the Archimedes.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LYRICS

• **Notator** ***on the Atari ST provides and interface which is clear and simple to an accomplished musician; other programs are not so friendly and require programming-type knowledge.***

If you decide to make the internal chip your first foray into music on your micro then here are a few points to bear in mind:

The heart of any music system is the sequencer which is to music what a word processor is to the office. It organises a series of notes in correct order and will repeat specified sections if asked nicely. It will also contain information relating to what sound is to be played, for how long, and even what effect should be applied to that particular note. If we are using internal voices the sequencer tends to be of the step-time variety – you write the notes in one by one, sometimes graphically, sometimes using a string of commands. Sequencers that control external sound generators tend to be real-time ones – that is, they act like a recorder.

- Beware of programs that invite you to enter notes as a data string. This procedure can be frustrating as you will need to know exactly what notes you want beforehand. However most programs that create games music use this type of program, as they are very economical on memory space.

- Traditional notation is only good if you can read music. If crotchets and quavers mean nothing to you then look for programs that have a graphic score display – pretty patterns that display the notes as blobs on the screen. The bigger the blob and higher up the screen, the longer and higher the note.

- Make sure you can save the tunes and file them; you should ideally be able to store the tune completely and also sections of it separately.

- Ideally you should have some preset sounds and some way of easily being able to create your own without having to resort to difficult maths and data strings.

One of the chief weapons in the synthesist's armoury is the sampler: the device that does to sound what a video digitizer does to an image. Having sliced the sound up at a rate of up to 40,000 times a second, the sampler will let you edit any or all of the sound, reverse, loop and generally stand it on its head. Both the Archimedes and Amiga can not only play back and manipulate samples with ease, but at the same time run sequencing software. Although there is sampling available for the ST and other micros, for the real serious business of sound creating you will need to purchase a separate dedicated sampling unit. Even the most basic dedicated sampler will set you back about £750; the popular Akai range of samplers starts at about £1450 plus. However a humbler start to sampling on your micro could set you back as little as £35.

Where sampling computers score heavily over their dedicated stand-alone counterparts is the visual display of the wave form. Having got our sample into the machine we need to manipulate in all sorts of ways;

- Sections need to be identified so that they can be either copied or cut and pasted elsewhere.

- There needs to be some way of throwing away unwanted garbage and "zooming" – magnifying – the wave forms left so that fine editing can be achieved.

- A choice of sampling rates should be on offer. You don't want to chew through unnecessary amounts of memory.

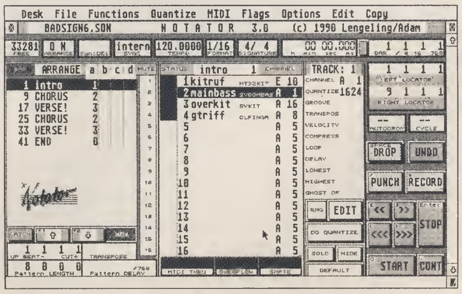
- It should be controllable via MIDI, preferably for more than one note at a time – if MIDI is not your raison d'être then check to see if the samples can be stored in a format that can be incorporated into a game or some utility. Endless fun can be had by substituting your own sound effects in games.

- It goes without saying that the sound samples should be able to be stored, and in the configurations that they were made.

- Real looping is a must. 'Looping' is sampler jargonese for the multiple repetition of a section of the sound sampled.

USING EXTERNAL SOUNDS: MIDI

The second option is to utilise the processing power of the micro to organise music. Some years ago the major synthesiser manufacturers in the world got together with very much the same idea. They had progressed to the point where all their instrument communication systems, adding synth A to synth B, were contradicting one another and the all important sales figures were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EDIT
DO QUANTIZE
SOLO
HIDE
DEFAULT
STOP
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CONT
CATCH
UP BEAT- CUT+
TRANSPOSE
Pattern LENGTH
Pattern DELAY
MIDI THRU
OVERFLOW
SMPTE
Notator

• The sequencer is the core program when it comes to computer music. Unfortunately they are necessarily complicated and tricky to use.

MAKES MUSIC

descending rapidly. Thus it was that MIDI – Musical Digital Instrument Interface – was born. MIDI turned out to be a life-saver, and from about 1984 pretty well any instrument worth serious consideration has MIDI ports fitted.

In outline it allows notes and all other information related to performing on the instrument to be turned into a common code and transferred in real time to another instrument. Because digital information is being transferred, it is a logical step to put a computer in the chain as a storage device. And since a micro is best at dealing with data, why not leave the problem of sound generation to external sources and let the power of the micro manipulate and control them. The micro has been taking an increasingly important role in the creation of tunes and sounds and many of our beloved chart artists and production teams owe as much to their micros as they do to their sometimes dubious talent.

The two prime uses of a micro in the MIDI music chain are 1) acting as a sequencer – a device that stores and plays back performance data much in the manner of a tape recorder and 2) programming the synths themselves to create new sounds or put sounds into them acting as a sound library for the synth.

SEQUENCING

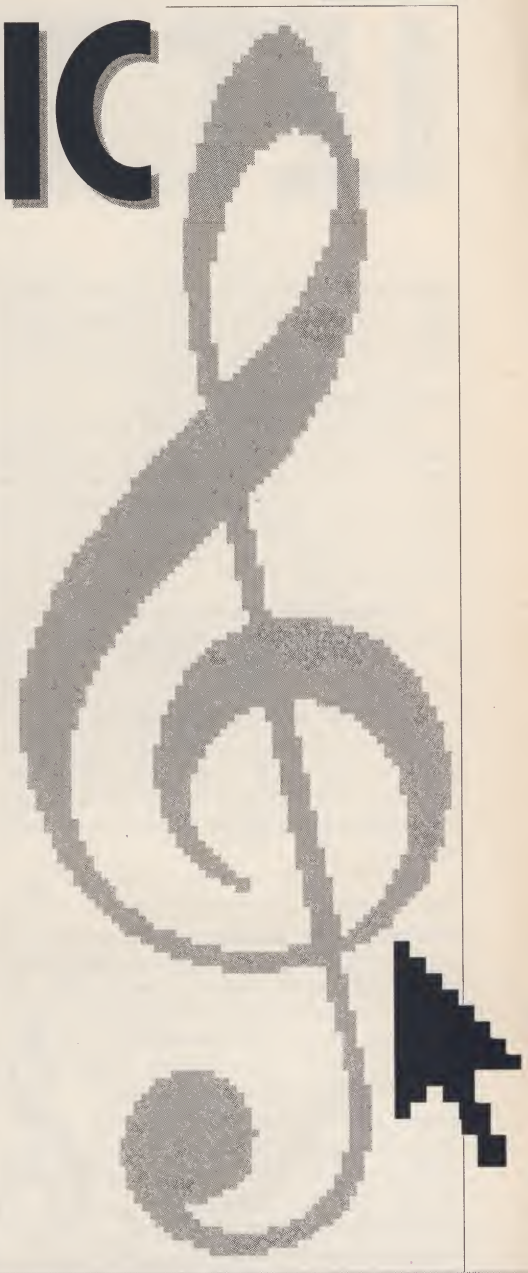
Without the sequencer there would a considerable difference in the music produced and written today. There are dedicated stand-alone music sequencers but for our purposes we are talking about software that turns the computer into one. A typical sequencer acts very much in the manner of a cassette recorder. You can record, say, the chords to your piece; play it back and whilst hearing it record another instrument, a bass line, on a separate track. Because MIDI can distinguish between 16 channels of separate musical information it can distinguish between the chords and the bass line which are assigned to separate channels, and, of course, separate synths which are to set to receive on the appropriate channels.

With any reasonable sequencer you can select any particular part, zoom in, and edit the blunders right out. This is done either numerically, graphically using some sort of grid and graph display, or in traditional music notation. Some programs boast all three methods. Most sequencers have a facility called 'quantise'. This will 'round up' the errors in the timing of the notes or drum beats to whatever tolerance you define.

The other great thing about sequencers is the ability to make up a small section like a drum pattern 'loop' or repeat however many number of times you like. In the best sequencing packages you can define whole sections of the tune and re-order them, put in gaps for new sections and even change the key whenever you like. Nearly all sequencers will let you copy data from one track to another and also mix and merge data from two tracks to a third.

Here we come to another advantage of the MIDI sequencer. When you copy or mix individual tracks on a tape recorder (known in the trade as 'track bouncing') there is a slight deterioration in quality because we are talking analog magnetic information here. But with a digital sequencer you can mix merge and copy until it comes out of your ears and it will still sound like the original. That's because you are asking the sequencer to actually play the instrument(s) itself.

By using the power of the micro to store, edit and control music you can use the technology as a extension of your ideas, not as a substitute for them. It doesn't require that much of an outlay especially if you bargain hunt through the classifieds and special offers, armed with a pretty good idea of what to look for. Enjoy.



SOUNDS

Making new ones, changing old ones

For a moderate fortune you can buy lots of sounds for individual synthesisers. These either come on cassette, or more usually RAM packs or cards. With suitable software though, you can create your own very easily. If you just imagine that any one sound usually requires about anywhere between 50 to 500 different peripherals being set, then work out that the LCD on most synths shows only a few 24 character lines, then you have some idea of the mental powers you need to keep all these figures in your head.

If you are like me you need the shape of the sound shown to you in jolly pictures.

CREATING SOUNDS

A Voicing Program will talk to your synthesiser on the Exclusive part of the MIDI code and graphically display the parts that go to make up the sound. By shuffling the various bits about you can create new sounds much more easily. What's more, most voicing programs have a library facility that catalogues your sounds and lets you build up banks of sound that you can transfer in one go to your synth. Super smart programs of this ilk will actually go some way to helping you create sounds. Most programs of this sort only work with one model of synthesiser but there are also programs that act as universal programmers. The basic program is a shell into which you haul in templates that correspond to the way that the different synths create sounds. If you have enough memory, some of these will hang around in the background while you use the sequencer or whatever.

WHAT TO LOOK FOR IN A VOICING PROGRAM

1) It should be pretty obvious how it operates. In other words, try to avoid programs that give merely numerical lists. These are only one step up from the synth itself. Graphic display is the order of the day.

2) Any alteration you make to the sound is updated on the display. Preferably you should be able to drag the display around.

3) All the main sound parameters are on one screen – it's no fun flipping between two or three screens to fix up a sound.

4) It should be able to store not only individual sounds but banks of sound as well; the whole sound memory of the synth. Look for the magic word 'librarian'. It goes without saying that it should be able to transfer either single voices or whole banks of voices and it should be easy to create and re-order the sound banks. If it is a program for a tone-module then the playing configurations should be easily alterable as well.

5) The sound you are creating should be playable from the QWERTY keys.

6) Any 'randomise' feature is a bonus; you can use it as a basis for computer-aided inspiration when messing about trying to create new sounds.

LET THE MICRO TA

Computer controlled music has over the past ten years been gradually filtering its way from the incredibly rich pop-star to the budding musician in their bedroom. The advent of MIDI and relatively cheap equipment may mean that electronic beats are now within everyone's grasp, but how does it all work. Maff Evans attempts to unravel some of the mysteries of MIDI.

Electronic music is by no means a new trend. Even as far back as the Sixties and early Seventies, bands such as Germany's Kraftwerk were experimenting with all manner of electronic gadgets to produce innovative and interesting sounds.

It was during the Seventies that a new machine appeared that would revolutionise modern music – the sequencer. Early sequencers worked by sending short pulses of electricity out to synthesisers, producing a particular note at a particular time. The machines were extremely unreliable, occasionally losing time or hitting the odd bum note.

The Eighties saw a distinct change in the way electronic music produced, thanks to the advent of MIDI.

WHAT THE HELL IS GOING ON?

For those of you who wouldn't know a drum machine if it leapt up and bit you on the bum, MIDI actually stands for Musical Instrument Digital Interface and is basically a communication standard for electronic music equipment.

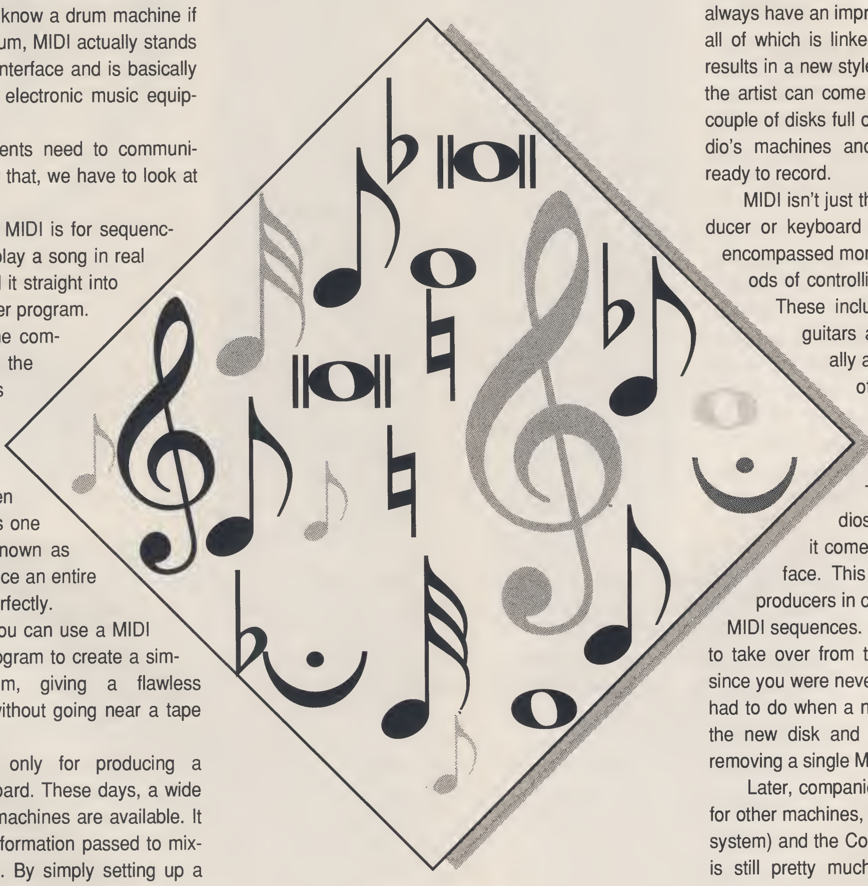
"Why do musical instruments need to communicate," you may ask. To answer that, we have to look at a few uses of MIDI.

The most frequent use of MIDI is for sequencing. Sequencers allow you to play a song in real time on a keyboard and record it straight into a computer running a sequencer program. Once you have the song in the computer's memory, you can edit the data to correct any mistakes you have made before committing yourself to tape. If you lack the necessary skills to actually play your song, then you can simply enter the notes one at a time on the computer (known as Step Time Recording) to produce an entire song with every note played perfectly.

At the most basic level, you can use a MIDI keyboard and a sequencer program to create a simple song in your bedroom, giving a flawless performance time after time without going near a tape recorder.

However, MIDI is not only for producing a sequence of notes on a keyboard. These days, a wide range of MIDI programs and machines are available. It can also be used to control information passed to mixing desks and tape recorders. By simply setting up a pre-defined pattern, tape machines can be switched on and off and faders set at just the right point of a song.

These features are found on the more expensive pieces of equipment usually found in studios, but even on a fairly limited budget of around 500 or 600 pounds you can set up a fairly impressive recording system using MIDI. All you need is a simple keyboard capable of receiving MIDI messages, a computer, a MIDI interface and a MIDI sequencing program (see figure one).



LIFE IN THE BIG LEAGUE

When you're ready to progress on to more ambitious projects you can expand your set up to include a whole host of systems. From effects boxes and mixers to samplers and drum machines (see figure two), but this is where the technology starts to get more expensive.

No matter where you go, studios these days will always have an impressive range of music technology – all of which is linked together via MIDI. This not only results in a new style of music, it also saves time, since the artist can come to the studio simply armed with a couple of disks full of MIDI data, load them into the studio's machines and hey presto! The song's almost ready to record.

MIDI isn't just the property of the techno-boffin producer or keyboard player though. As the technology encompassed more and more equipment, other methods of controlling MIDI systems began to appear. These include electronic drum kits and even guitars and saxophones! This allows virtually any style of music to take advantage of MIDI from acid to classical!

ALL TOOLED UP

The main computer favoured in studios is the Atari ST, due to the fact that it comes supplied with a built-in MIDI interface. This resulted in a number of software producers in creating a host of programs to create MIDI sequences. Soon enough Atari machines began to take over from the dedicated sequencer hardware, since you were never tied to a particular system. All you had to do when a new sequencer came out was insert the new disk and your set up was ready – without removing a single MIDI lead!

Later, companies began to release MIDI interfaces for other machines, such as the BBC Micro (the UMI 2B system) and the Commodore Amiga. Although the Atari is still pretty much the industry standard as far as sequencing goes, the Amiga is building up a strong following with the superb MIDI package *Music-X*.

Despite the competitiveness of the software market, sequencer programs still tend to be rather expensive. Steinberg's *Cubase* for the Atari is certainly an outstanding package, but a mite expensive at around £600! All those interested in producing music who's jaw has just hit the floor...DON'T WORRY! There are a number of alternatives.

To begin with, a beginner's version of *Music-X* is available for under £80, and by hunting through PD libraries there are a few programs available their for little more than the price of a disk!

BASIC MIDI SET-UP

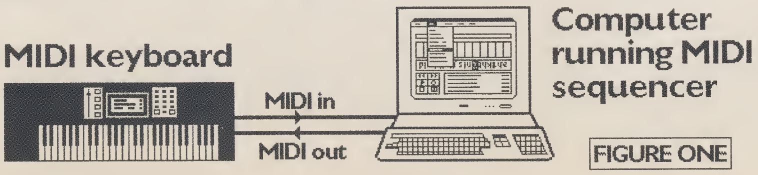


FIGURE ONE

AKE CONTROL...

produce the basic drum pattern loops we all know to create soul and dance tracks, but there are also those who are experimenting with all manner of MIDI devices to create new and occasionally unusual music.

Black Box (of *Ride on Time* fame) use an Atari ST running C-Lab's *Notator* to create their hit tracks. The sequencer is linked up to sampling equipment, which they use to combine various sounds to use on the final song. Their particular brand of music is a perfect example of how MIDI and sequencing has revolutionised chart and dance music, making it quicker and easier to produce club rhythms.

MIDI is, more often than not, the producers tool. Another advocate of the Atari is Youth, former member of Killing Joke and man at the remix controls of a number of chart acts, including dance sensation Blue Pearl and Stourbridge's finest Pop Will Eat Itself. Youth combines samplers, keyboards and even old analogue gear to produce his eclectic beats.

On the outskirts of pop music are those who have taken MIDI and experimented with the technology to produce varied and original music. A prime example of this is Manchester indie-guitar band What? Noise. They use an Atari to generate powerful drum patterns and sample loops to back up their manic guitar work outs, producing an unusual blend of styles that works particularly well.

One of the most interesting current use of music technology is beginning to appear from Europe and the dancefloors of Chicago – once famed for bringing us House Music. The new dance style tipped to take British clubs by storm is a combination of hard-edged, metallic rhythms and pounding bass riffs backing up abrasive vocal samples from films and news-reports. Already a number of clubs specialising in this new industrial-dance have begun popping up, from Wolverhampton's Dreamhole to London's Headhunters and the highly popular Hard Club '92.

The major advocates of this powerful electronic music are Belgium's Front 242 and Canada's Skinny Puppy. 242 use state of the art MIDI technology, including Cubase on the Atari and racks of Akai sampling equipment to assemble their eclectic collection os cut-up voices and harsh rhythms.

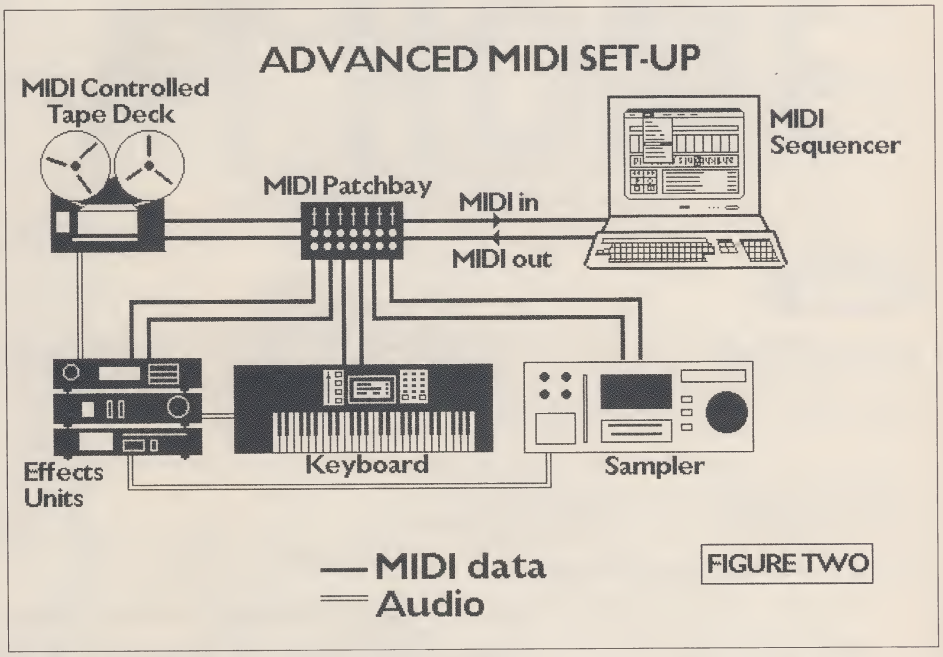


FIGURE TWO

The new dance style tipped to take British clubs by storm is a combination of hard-edged, metallic rhythms and pounding bass riffs backing up abrasive vocal samples

Skinny Puppy take a more experimental view of musical technology, using sequencers to produce highly complicated and often overpowering rhythms to back their distorted and warped samples. The results are the opposite end of the electronic music spectrum to Black Box, giving a perfect example of how versatile the new technology really is.

GET IN AT THE DEEP END

The only way to really experience the joys of MIDI is to actually get hold of some cheap equipment and playing around with some of the gadgets for yourself. Once you have a grasp of the basic techniques, it soon becomes immense fun pounding out drum patterns and keyboard riffs. Soon you could be experimenting with weird samples and rhythms like Skinny Puppy, or even producing a bigger dance smash than Black Box!

Get on the beat and have yourself some fun! ■

Plenty of potential for exapansion

Once you've bought your MIDI keyboard and spent some time with it connected to your computer, you'll probably yearn for some more kit to help you realise MIDI's expansion capabilities. To avoid filling the room with keyboards, some clever person came up with the idea of the expander. This is a box that contains all of the electronics from a synth, sampler, piano, organ or other piece of MIDI kit but instead of havinf a full sized keyboard, it communicates with your existing keyboard via MIDI leads.

ORGAN GRINDING

The Elka/Orla flute expander is a small grey box with a set of controls that closely match the Tone Wheel Hammond Organ. For a few pence under £500 you get a drawbar organ with percussion, presets, and the ability to take its control from two keyboards in the normal electronic organ way or from one if that's all that's available.

It's simple to build up a library of your favourite organ sounds and save them onto prorammable presets. There are pre defined presets too so you can get straight to the three most common organ sounds at the push of a button.

The effect that gave the Tone Wheel organ its familiar rich sound was achieved by connecting it to a large and cumbersome speaker system enclosed in rotating baffles. This system known as a 'Leslie' after the company that pioneered it gave the sound a fast 'rolling' tibia effect or a slow 'chorale' effect.

The Elka/Orla expander contains electronic circuitry that faithfully reproduces the 'Leslie' sound even down to the gradual build up of speed to the rolling tibias. The effect on the sound is to simultaneously change the frequency and amplitude by a small amount producing a rich tremolo with an underlying vibrato.

The expander has a magic chord feature that allows chords to be produced in the melody and although a purist might frown on such help, it offers the beginner a quick way to pleasant full sound.

ON THE RECORD

The Brother MIDI Recorder is a small expander box with a 3.5-inch disk drive and controls very similar to those on a standard domestic cassette recorder or CD player. Instead of baffling you with layers and levels of screens, it works in a similar way to the tape recorder. The supplied disk has several demo songs on it and room for your own compositions too. If you'r happy with one pass recording or you want somewhere to lay down a basic track to work from, this little gizmo is for you. You don't need a degree in Physics to use it, even our cat can understand the simple controls. It's a simple no nonsence no frills MIDI recorder that allows you to experiment with basic recording without having to set up a full blown studio. It won't break the bank either. At £250 it represents good value for your cash.

The Elka/Orla Flute Expander and the Brother MIDI recorder are both widely available from keyboard and musical instrument suppliers.

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RECORDING A SONG AT HOME

Jon Bates, a seasoned performer and recording artist, looks at setting up a studio at home, then takes you through the stages involved in the creation of a song.

The entire point on of this entire guide is obviously to produce a piece of music which you can then use to lead you into a world of fame and fortune – or at least play it to your friends.

Back in the old days of picking up a guitar and slamming out a few chords, the nearest most of us could get to 'music recording' was to sit an old tape recorder on the desk and hope that some of the sounds were picked up by it without all the background noise being included. The nearest we could have got to music production was to turn the tone control.

It has long been a part of the musos' book of myths that The Beatles recorded *Sergeant Pepper's Lonely Hearts Club Band* on two linked 4-track tape recorders – whether this is true is another matter entirely and one can only presume what George Martin would have given for an ST1040 running some of today's music software.

FUZZY LOGIC

Since then, however, the four track tape recorder – such as the Portastudio or plasticky Vesta Fire to name a very few – came onto the market and allowed anyone who wanted to, to record some more complicated overdubs. Even these, however, soon ended up as rather fuzzy sounding pieces rather than the pure masterpieces we had chasing around in our heads when playing the original.

One of the basic problems which this form of home recording is the fact that you are stuck with 4-tracks and any attempt at expanding on this by 'bouncing down' or ping-ponging' (two names for a process which basically means recording two or more separate tracks from different channels onto one empty track) inevitably ended in fuzziness and loss of top end. It was all so analogue.

> **The Beatles recorded *Sergeant Pepper's Lonely Hearts Club Band* on two 4-track tape recorders... one can only presume what George Martin would have given for an ST**

The computer obviously does not have the problems of background noise because it treats its sound handling in a very different and digital manner. Because the sounds which you create are kept in a pure, aurally unpolluted form it means that you have far more freedom to go on and on playing with them.

However, you should be wary of using the technology available to create bland, lifeless numbers, I'll show you a few tips for avoiding this a little later on in the piece. Essentially, then producing a piece of music with your home computer requires the following factors to be born in mind:

- **Planning**: it is always a good idea to have the basic feel for the piece which you wish to work on before you go marching into it with all instruments blaring.

- **Patience:** don't for one minute think that just because you have the technology at your disposal which has the potential to create perfect sounds that it will do this straight off.

- **Imagination**: That's the magic element

Finally, bear in mind the following which you can never have enough of in a decent home set-up: leads, get these from most good music stores. Batteries, if you're using effects pedals or MIDI instruments these are a must, lots and lots of good strong coffee – you'll only get carried away and need to perfect that drum. ➤

WHAT DO YOU NEED TO SET UP AT HOME

Most people with an interest in the recording and production end of the music market can only dream about setting up in a spacious studio. We look at such cathedrals of sound as Abbey Road or Air Studios in awe. We know that the only reason they are able to get that rich, ballsy drum sound is that the room it was recorded in was huge.

There is no need to despair though. Armed with a computer and some decent software it's amazing what you can cram into 6-feet by 8-feet with a little thought. But where to start?

The most important item(s) you will need is a decent set of speakers. You can improve even the most modest sound system by shopping for a large and decent set of speakers. The reason for placing this at the top of the to get list is that, no matter how good your software, nor even that you might have a few thousands of pounds worth of Stradivarius lying about the place, none of it will be any good if you can't hear properly what you are trying to do. There are many names of dedicated speaker manufactureres to conjure with, but look out especially for the following: Kef, Celestion, Wharfedale, Tannoy. In a sociable world of course, or if you have to work late at night, then the same would apply to a decent set of headphones.

For amplification, a medium to high quality domestic hi-fi amp will do, provided that it can take an 'aux' input. This would be much better than a guitar amplifier which can be quite noisy when you get up close.

GETTING IT TAPED

The next item on the shopping list is something on which to preserve your efforts, you should go for a decent cassette recorder, and if distributing copies of your efforts is one of your goals, then a twin cassette deck is preferable.

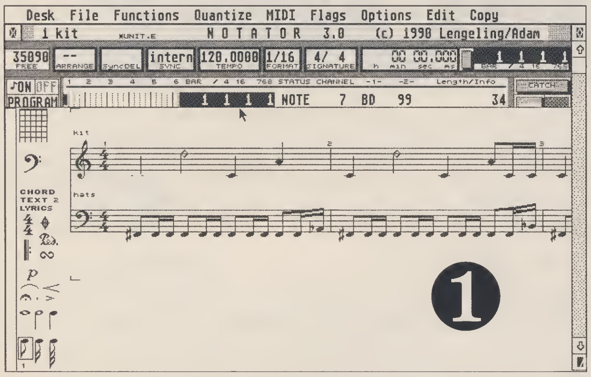
If you have several instruments all of which you intend to have running together then you will need some sort of sound mixer. Nothing too ambitious or over the top: a flick through a few brochures will give you a rough idea but the cheaper end of the market tend to add lots of noise. You can combine the mixer and recorder if you wish by purchasing one of the many multi-track cassette recorders.

A trip to your local branch of Tandy will also be worthwhile, even if you don't like to look of the mixers you might turn up a bargain on the microphone front or even track down a reverb unit which can be tweaked to produce some unusual effects.

Although Amstrad do have a unit on the market that professes to do all that I have mentioned above, it is inherently noisy and worse still the noise will stay with you – there is simply no way of getting rid of it – in other words it has no Dolby or DBX noise reduction systems, which are essential in any home recording system. Finally, you will need a micro, maybe a MIDI interface and of course a instrument or two. You'll find the features in the rest of this supplement have more details on those.

RECORDING THE SONG

What follows is a walk through of a typical piece and how it might be built up on a computer sequencer. I've used quite an upmarket program, C-Lab's *Notator 3.0*, for the demonstration just to show off one or two features but the piece could have been done in much the same manner on any sequencer. If it smacks a little of painting by numbers then it might be as well to bear in mind that nearly all music of whatever type and ethnic origin follows a pattern and form. The measure of creativity is how fresh and new you can make it feel; expanding, exploring and bending the basic outline.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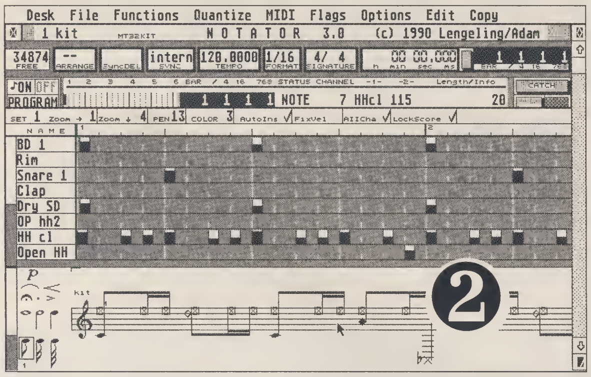
ON OFF
PROGRAM
1 2 3 4 5 6 BAR / 4 16 768 STATUS CHANNEL -1- -2- Length/Info
CATCH
kit
hats
CHORD TEXT 2 LYRICS
1

```
1 1 1 1 NOTE    7  BD   99          34
```

I picked an old blues number *Born under a Bad Sign* and despite it having been released by Bart Simpson recently(!), it's having a Janet Jackson treatment: heavy repeated riff with tight snappy drums.

The sounds are coming from a Yamaha SY77 set on channels A1-16 and a Roland MT32 tone module set on channels E1-16. This is purely because my own set-up makes use a several 'rings' of MIDI channels; the concept is that you have more than one MIDI out port from the micro and each port runs 16 channels of MIDI independently, hence the prefix letters.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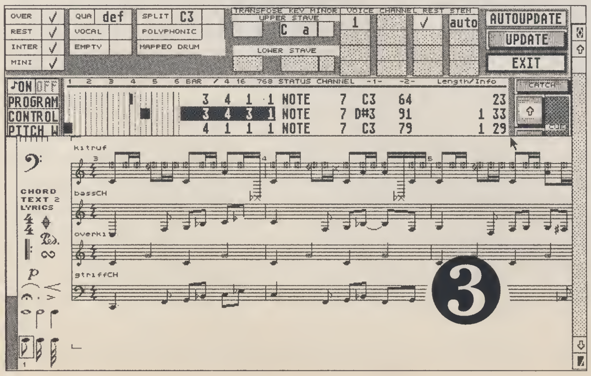
SET 1 ZOOM + 1 ZOOM + 4 PEN 13 COLOR 3 AutoIns √ FixVel AllCha √ LockScore √
NAME
BD 1
Rim
Snare 1
Clap
Dry SD
OP hh2
HH cl
Open HH
kit
2

```
1 1 1 1 NOTE    7  HHcl 115         28
```

BEGINNING THE BEGUINE

To start off, decide the basic drum pattern for the song. This may be altered as the song progresses but it will start the ball rolling.

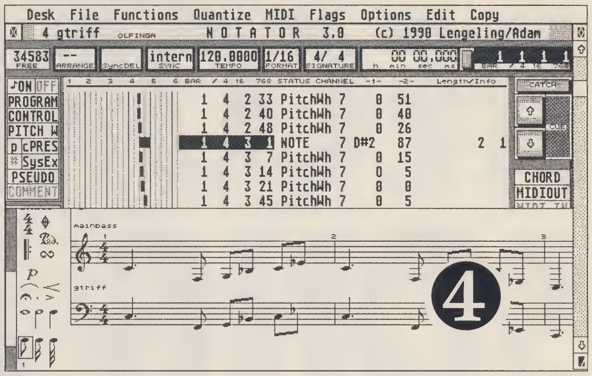
Screenshot ❶ shows eight bars worth of pattern which is all I really need to work on for the moment. First I add the basic drum kit which consists of a snare and kick drum, then we put a hi-hat rhythm on top.


OVER √
REST √
INTER √
MINI √
QUA def
VOCAL
EMPTY
SPLIT C3
POLYPHONIC
MAPPED DRUM
TRANSPOSE KEY MINOR VOICE CHANNEL REST STEM
UPPER STAVE
C a
1
√
auto
LOWER STAVE
AUTOUPDATE
UPDATE
EXIT
ON OFF
PROGRAM
CONTROL
PITCH W
CATCH
kitruf
bassCH
overkit
gtriffCH
CHORD TEXT 2 LYRICS
3

```
3 4 1 1 NOTE    7  C3   64          23
3 4 3 1 NOTE    7  D#3  91        1 33
4 1 1 1 NOTE    7  C3   79        1 29
```

The drums are from the Casio MT32 keyboard. I have used a basic quantise technique in order to round up my errors to the nearest 16th note (semi-quaver).

Many programs have a 'capture strength' that decides just how efficient the quantise will be. The greater the efficiency of the quantise, the more accurate but anaesthetised the result will be. Quantise 16/24 leaves a slight margin of error in the notes which hopefully succeeds in giving the whole thing 'feel' rather than producing that all too familiar perfect computer sound which normally ends up by sounding like Muzak.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PROGRAM
CONTROL
PITCH W
p cPRES
SysEx
PSEUDO
COMMENT
1 2 3 4 5 6 BAR / 4 16 768 STATUS CHANNEL -1- -2- Length/Info
CATCH
CHORD
MIDIOUT
mainbass
gtriff
4

```
1 4 2 33 PitchWh 7     0  51
1 4 2 40 PitchWh 7     0  40
1 4 2 48 PitchWh 7     0  26
1 4 3  1 NOTE    7 D#2    87          2  1
1 4 3  7 PitchWh 7     0  15
1 4 3 14 PitchWh 7     0   5
1 4 3 21 PitchWh 7     0   0
1 4 3 45 PitchWh 7     0   5
```

GOING HYPER

So that I can edit them in *Hyper Edit*, thereby giving me access to each drum to draw in slight variations, I've mixed them onto one track; see ❷.

The tune has one main riff that is subject to slight variations for the chorus and verse. Having got the main drums sounding approximately as you want them, the next task is to get this riff down. Some time is spent finding a good solid sound for it as it is the foundation and hook for the whole number; settling on a BombBass sound on the SY which has plenty of guts and fills out the bottom end nicely. Several goes are necessary to get the right feel and the best take stays in the memory – altering velocity settings for a note here and there if it felt too hard or weak.

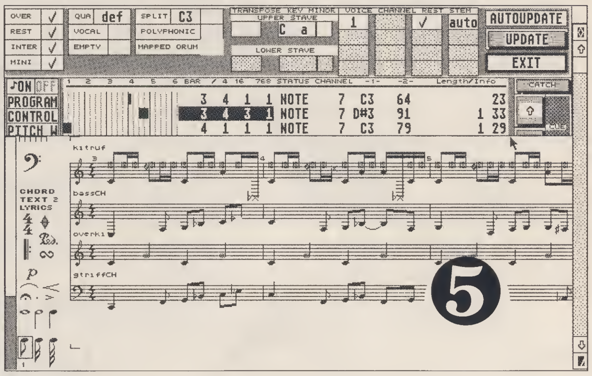
❸ is the result, this time in music notation with the data stream of notes in the upper half of the screen. I also added extra kick and snare drums from the SY to make the rhythm track really jump. The final balance of the two kits can be adjusted later, either by using MIDI volume controls, the volume controls on the instruments or by balancing them on the mixing desk itself.

The bass needs doubling for some sections so I overdub a guitar sound playing the same as the bass. However since I want to use pitch bend I haven't merely copied the bass part onto another track and changed the channel and sound; it's often better to redo the part again to get a live feel. ❹ is the result of this.

We still have only worked on eight bars but it forms the intro and master track for the song. Having saved it to disk, the whole pattern is copied to a new pattern, the bass and guitar discarded leaving the drum track. On top of this is put the slight variation to the main riff that constitutes the chorus of the song. OK. I could have gone through the parts on the edit page and changed them note by note but it could become too mechanical. The drums are still the same, shown in figure ❺.

The verse is created by the same process and then I piece the intro, chorus and verse together by using the Arrange section on the left hand side of the screen, ❻. This is often called Song Chain or similar in many programs and each reappearance of the patterns can usually have some modifications like transposition (changing the key) or an instrument not playing that time round.

This then is the first thumbnail sketch of the piece. It has a long way to go before we have a final product and a great many decisions have to be made along the way: key changes maybe, drum pattern alterations for different sections, some sort of ending and so on and so forth. It may well be that I drop the whole lot onto a cassette and go in search of a vocalist. I would do this at this stage so that unforeseen problems of key, timing and feel can be corrected at this stage rather than later on when it would be a difficult task.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POLYPHONIC
MAPPED DRUM
TRANSPOSE KEY MINOR VOICE CHANNEL REST STEM
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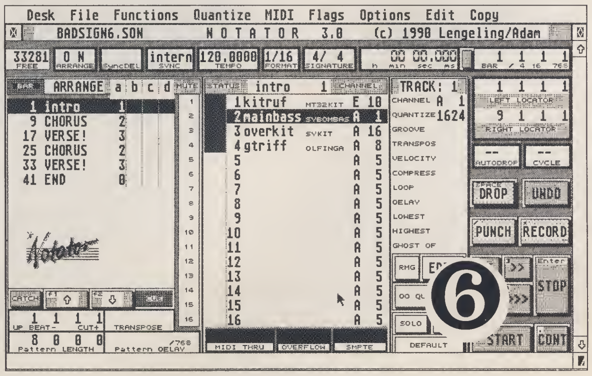
LOWER STAVE
AUTOUPDATE
UPDATE
EXIT
ON OFF
PROGRAM
CONTROL
PITCH W
CATCH
kitruf
bassCH
overkit
gtriffCH
CHORD TEXT 2 LYRICS
5

```
3 4 1 1 NOTE    7  C3   64          23
3 4 3 1 NOTE    7  D#3  91        1 33
4 1 1 1 NOTE    7  C3   79        1 29
```

Adding acoustic instruments like voice, guitar, etc can be done in several ways. The most obvious is to record it at the same time as you record the finished backing track from the synth modules to tape but it does mean that it has to be absolutely spot-on. Maybe a multi-track cassette would give a little more flexibility. The next step in sophistication is to use SMPTE or MIDI Time Code – to 'lock' the sequencer to a time code recorded on one track of the multi track machine.

The ultra smart method is to use the digital direct to hard disk recording system integrated with a MIDI recorder, a technique which is described elsewhere in this supplement.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STATUS
CHANNEL
Notator
CATCH
CUE
UP BEAT- CUT+
TRANSPOSE
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MIDI THRU
OVERFLOW
SMPTE
TRACK: 1
CHANNEL A 1
QUANTIZE 1624
GROOVE
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LOOP
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LOWEST
HIGHEST
GHOST OF
RMG
ED
OO QL
SOLO
DEFAULT
LEFT LOCATOR
RIGHT LOCATOR
AUTODROP
CYCLE
DROP
UNDO
PUNCH
RECORD
>>
>>>
Enter
STOP
START
CONT
6

```
 1 intro    1
 9 CHORUS   2
17 VERSE!   3
25 CHORUS   2
33 VERSE!   3
41 END      0
```

```
intro 1
 1 kitruf    MT32KIT  E 10
 2 mainbass  SYBOMBAS A  1
 3 overkit   SYKIT    A 16
 4 gtriff    OLFINGA  A  8
 5                    A  5
 6                    A  5
 7                    A  5
 8                    A  5
 9                    A  5
10                    A  5
11                    A  5
12                    A  5
13                    A  5
14                    A  5
15                    A  5
16                    A  5
```

```
1 1 1 1        1 1 1 1
9 1 1 1        8 0 0 0
```

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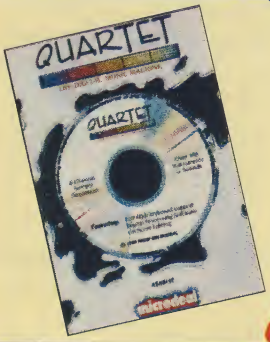

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1) Who was the keyboard player for '70s super-goup Genesis?

a) Tony Banks
b) Gordon Banks
c) Gordon Richards
d) Joddrill Banks

2) What do the black keys on a piano signify

a) They forgot to paint them white
b) For Paul Macartney and Stevie Wonder to sing about
c) Sharps and flats
d) Major 7ths

3) What is the only musical key with no sharps or flats?

a) C major
b) D minor
c) E sharp
d) C flat

4) Who was the famous American keyboard player who specialised in cheesy grins, spangly suits and candlabra?

a) Bach
b) Colin Powell
c) Liberace
d) Roger Rabbit

5) Which family of musical instruments does the piano belong to

a) Strings
b) Precussion
c) Woodwind
d) Robinson

6) Which company is known for producing pianoes?

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b) Steinway
c) Gibson
d) Fender

7) Where is Cheetah based ?

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b) Paris
c) Berlin
d) Ulan Bator

8) What is waltz time in musical notation?

a) 3/4
b) 4/4
c) 65/8
d) 6/8

9) Who was the famous Spanish classical guitar player?

a) Jimi Hendrix
b) Segovia
c) John Lennon
d) Rick Wakeman

10 Who was the famous gypsy guitar player who lacked digits?

a) Django Rheinhart
b) John Williams
c) Julian Bream
d) Julian Clarey

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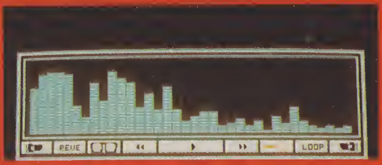
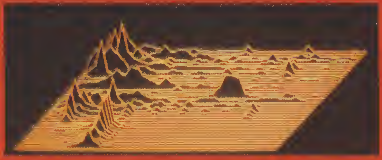
MASTER SOUND 2

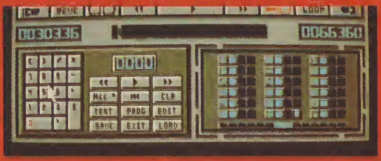
SOUND SAMPLING HARDWARE AND SOFTWARE FOR THE ATARI ST & STE



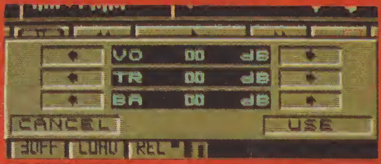
36 BAR GRAPHIC EQUALISER DISPLAY



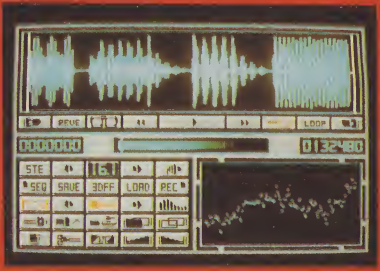
3D FFT DISPLAY SCREEN



SEQUENCER CONTROL PANEL



NEW STE CONTROL PANEL



MAIN EDITOR SCREEN WITH OSCILLOSCOPE

WHAT IS MASTER SOUND?

Master Sound is a low cost, high quality sound sampler for the Atari ST & STE range of computers. The sampler cartridge enclosed in this package plugs into your ROM port on the side of your computer and allows you to record sounds from devices such as Personal Cassette players, Compact Disc Players etc. Once in the computer MASTER SOUNDS unique editor will enable you to edit the sound in practically any way you can imagine. Once you have the sound sample how you want it, you may incorporate it into your own Demo's or programs or use MASTER SOUNDS own built in sample sequencer to play back the sample in sequence with other samples!

THE MASTER SOUND EDITOR

Incorporates the following facilities:

* SAMPLE
* CUT
* FADE IN
* SHRINK
* LOAD
* VU METER
* AVR FORMAT
* PLAY
* COPY
* FADE OUT
* FILTER
* SAVE
* SEQUENCER
* STE VOLUME, BASS & TREBLE CONTROL
* LISTEN
* OVERLAY
* VOLUME
* MAGNIFY
* SCOPE
* MIDI TRIGGER
* LOOP
* WIPE
* REVERSE
* TRIGGER
* REAL TIME FFT
* 3D FFT DISPLAY

An impressive Spectrum Analizer, Oscilloscope and 3D FFT display enable the user to monitor frequency content and volume with ease, and help you to ensure that the sample quality is at its best.

THE MASTER SOUND SEQUENCER

Allows you to play back samples in a sequence. Up to 18 samples can be held in memory at once and sequences are as simple to record as tapping keys on the computers keyboard. Once recorded the sequencer can save the samples and sequence file out onto disc so that the files can be used in the sequence player provided.

THE MASTER SOUND DEMO

Allows you to play back your own sequenced sounds created by the editor while displaying picture files. This is great for creating your own public domain demo discs without having to be a computer programmer.

ADVANTAGES OVER MASTER SOUND 1

* Midi compatibility allows you to playback samples at different frequencies from an external midi keyboard with a midi-out socket.
* Additional STE options include Volume, Bass, & treble controls Playback via the STE's built in sound sockets.
* New 3D Fast Fourier Transform display allows you to see the samples frequency composition in a 3D display.
* Volume down option
* Choice of filters
* Choice of compression ratios
* Enhanced sample frequencies up to 30 KHZ
* Sequencer can now handle variable frequencies from 3 to 16KHZ

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UPGRADE FROM MASTER SOUND 1 PHONE FOR DETAILS

ATARI ST MASTER SOUND ORDER FORM

Master Sound is £39.95 post & packing £1 (all prices inc V.A.T.)

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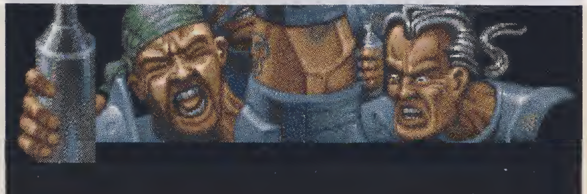

Stylishly violent

"WE MUST STOP THE SWEATSHOPS"
BRITAIN'S GAMES AUTHORS SPEAK OUT – SEE PAGE 8

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